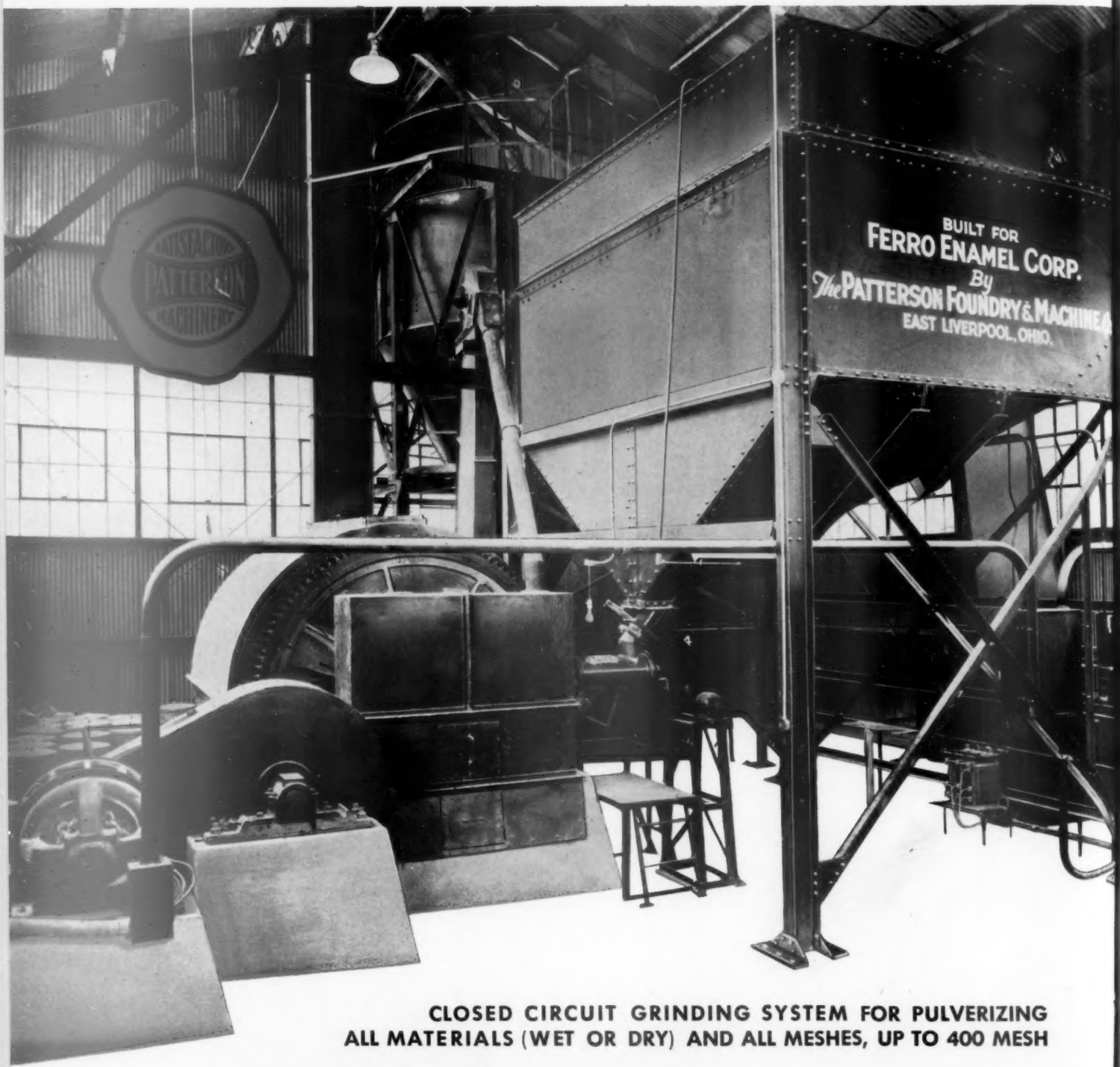
# PIT AND QUARRY

DECEMBER, 1936

S. S. Jupiter Goes into Service on Great Lakes . . . . Bessemer Revamps Commercial-Stone Plant . . . Vacuum Hoods on Drills Reduce Dust Hazard . . . Making Stone Waste Yield a Profit

HERE'S A TYPICAL PULVERIZING MACHINERY INSTALLATION DESIGNED, BUILT AND INSTALLED BY **PATTERSON**—BUILDERS OF GRINDING MACHINERY FOR 75 YEARS.

THIS GREAT PLANT GRINDS FELDSPAR FROM 8" ROCK TO 97% THROUGH 200 MESH, AT THE RATE OF 3000 POUNDS PER HOUR.




**CLOSED CIRCUIT GRINDING SYSTEM FOR PULVERIZING ALL MATERIALS (WET OR DRY) AND ALL MESHES, UP TO 400 MESH**

## THE PATTERSON FOUNDRY & MACHINE CO.

**EAST LIVERPOOL, OHIO, U.S.A.**

# During the winter–Plan for the Spring

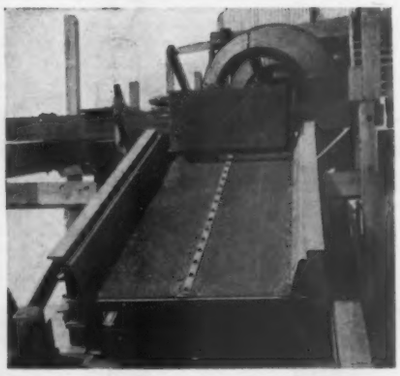
## SOME SUGGESTIONS FOR PROFITABLE MODERNIZATION

● Plan for lower operating costs and a better product when your plant opens up next spring, by making replacements and additions to your equipment now.

To take fullest advantage of the greater opportunities which should come from Government and other work, you must be able to meet rigid specifications.

A few suggestions for profitable modernization are illustrated. There are others. Send for Book No. 1240.

Address Link-Belt Company, Chicago, Philadelphia, Indianapolis, Atlanta, San Francisco, Toronto, or any other office located in principal cities.

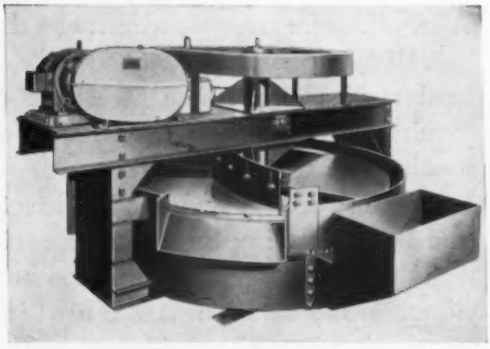


### SCREENING

Supplement your rotary screens with Link-Belt vibrating screens to obtain a better grading of the smaller sizes of gravel or stone. Rotary screens for better washing—vibrating screens for better sizing. The combination of both rotary and vibrating screens assures your ability to meet the most rigid specifications.

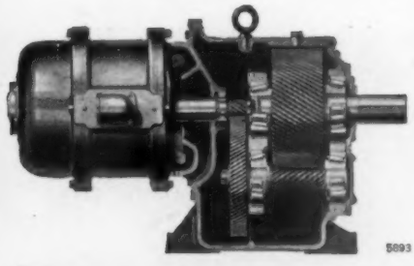
### SAND RECOVERY

The Rotoscoop is a perfected and dewatering unit which is capable of recovering fine grains and discharging dry enough for truck transportation. Send for Folder No. 1463.



### BELT CONVEYORS

Replace your old, plain-bearing belt conveyor idlers with modern Link-Belt anti-friction bearing idlers. Save power, assure dependability and cut down maintenance costs. The conveyor illustrated is equipped with the Link-Belt positive self-aligning idler which automatically and positively maintains the troughed conveyor belt central at all times.



5893

### REPLACE OPEN GEAR DRIVES

Greater efficiency as well as safety can be obtained by using Link-Belt speed reducers. The Link-Belt line includes herringbone gear, worm gear and motorized helical gear reducers as well as variable speed transmissions, silent chain and roller chain drives.

# LINK-BELT HANDLING AND PREPARATION EQUIPMENT

SEE OUR EXHIBIT AT—NATIONAL SAND AND GRAVEL EXPOSITION—MEMPHIS, DEC. 8-10

PIT AND QUARRY. December, 1936. Vol. 29, No. 6. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago, Ill. Subscription price: $2 for 3 years, $1 for 1 year in the U. S. and possessions. Canada, and Central and South America; elsewhere $1 additional for each year. Single copies 20 cents. Entered as second-class matter November 28, 1932, at the Post-Office at Chicago, Ill., under the Act of March 3, 1879.

# STUMPED

## BY A SCREENING PROBLEM?

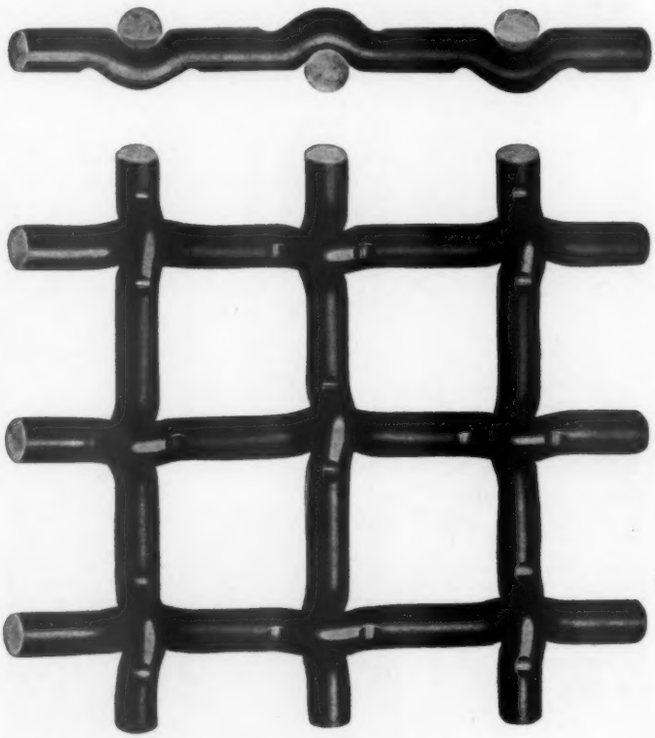
If so...why not take advantage of Roebling's 90 years of wire making experience?

After all...wire screen is wire...wire throughout. It will stand up under the beating of hard service only if the wire itself has the required strength, flexibility, toughness and stamina.

For almost a century Roebling has specialized in the making of wire to meet exceptionally severe requirements as to strength, vibration, and abrasion...wire used in products ranging from giant bridge cables to shovel rope.

Let us cooperate with you. Roebling Wire Screens are available for every sizing, cleaning and grading need.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, N. J. *Branches in Principal Cities*



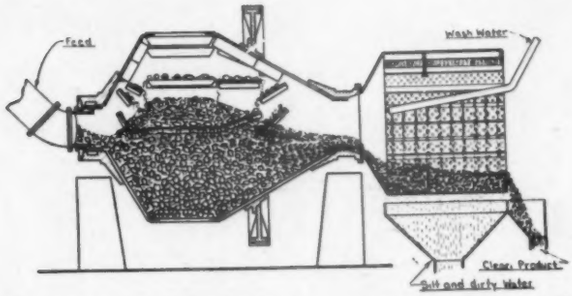
# ROEBLING *Wire Screen*

TRADE JERSEY MARK

**90 YEARS OF WIRE MAKING SPELLS THE DIFFERENCE**

# At the Sand and Gravel Convention We Will Tell You About

# The WHY of the CONES *of the* Hardinge Conical Scrubber




**The Hardinge Conical Scrubber and Rinsing Trommel—Note the Great Depth of the Mass.**

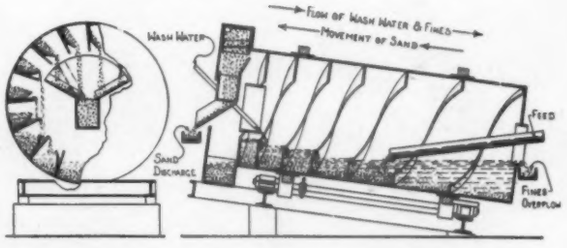
The Cones raise the level of material and bring the center of the mass to the largest diameter, away from the feed and discharge openings during rotation—see cut above—this gives greater mass weight and consequent disintegration of soft material. This also permits larger trunnion openings.

The Cones give a marked agitation of the mass, producing an intensive scrubbing action of harder particles against softer—this rubs clay balls to slime.

The Cones, which permit large trunnions, make it possible to use high shell speed—there are hundreds of more contacts of one particle against the other than is the case with cylindrical drums, trommed screens, logs, etc.

The Cones discharge the scrubbed product, without lifters—cutting power and reducing maintenance to a minimum. The Conical Scrubber will empty itself in a few minutes' operation without feed.

**Write for Bulletin No. 37**




**The Hardinge Counter-Current Classifier or Washer Showing Spiral Integral with the Rotating Drum.**

The Integral Spiral being attached to and rotating with the drum, rolls the material—does not scrape it—this eliminates dead corners, subjects all particles to constant contacts with counter current action of water, and practically eliminates wear.

The Integral Spiral permits starting under full load—it does not have to scrape through the dead mass.

The Integral Spiral produces little or no agitation and thus does not upset natural classification and washing.

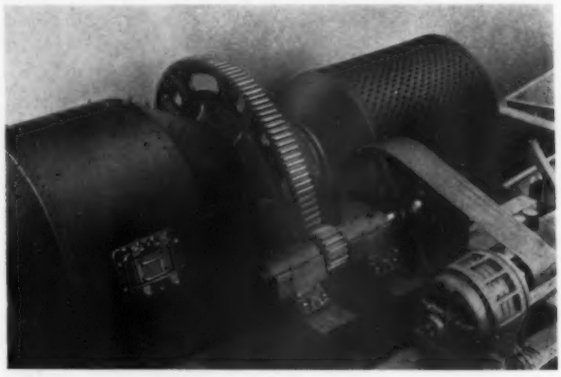
**Write for Bulletin No. 39A**

**Booth No. 68—Memphis**
**Dec. 7, 8, 9 and 10**

**HARDINGE COMPANY**
Incorporated

YORK, PENNA.—Main Office & Works
NEW YORK—122 E. 42nd St. CHICAGO—205 W. Wacker Drive

# The WHY of the CONES *of the* Hardinge Conical Scrubber



**Installation View of Conical Scrubber Eliminating Soft Stone from Gravel and Rubbing Clay to Slime.**

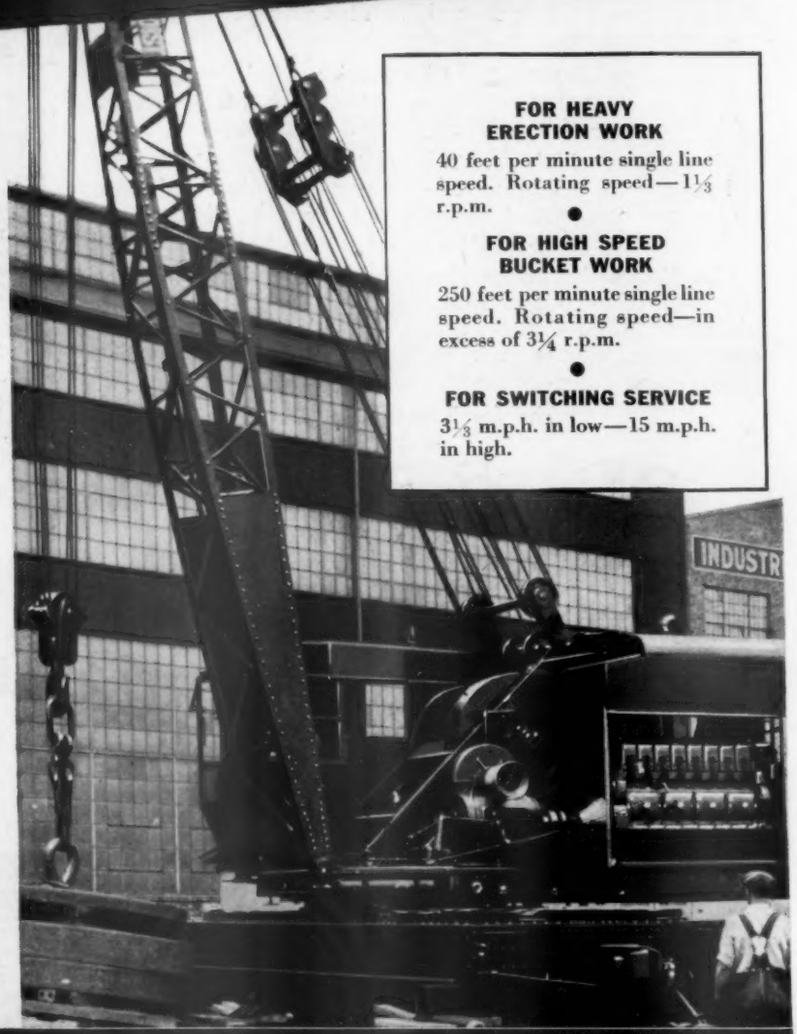
# The WHY of the INTEGRAL SPIRAL of the Hardinge Counter-Current Classifier and Washer

**The Counter-Current Classifier or Washer Used for Classifying or Cleaning Sand, etc.**

# Performance Counts

## WITH

## INDUSTRIAL BROWNHOIST




**FOR HEAVY ERECTION WORK**

40 feet per minute single line speed. Rotating speed—1⅓ r.p.m.

●

**FOR HIGH SPEED BUCKET WORK**

250 feet per minute single line speed. Rotating speed—in excess of 3¼ r.p.m.

●

**FOR SWITCHING SERVICE**

3⅓ m.p.h. in low—15 m.p.h. in high.

## AND THEY CHOSE AN F-M 36 TO DO IT!

● When specifications for this rugged 50-ton locomotive crane had to be met by Industrial Brownhoist, its power plant presented a problem. The Diesel selected had to have plenty of power and stamina in reserve for heavy erection work—yet be light and economical enough to fit both the space and cost requirements that traveling crane work imposes.

So they chose an 8-cylinder 5½" x 7½" F-M 36.

After installation and testing, the engineers' reports came through—"The performance of your engine in the extensive tests we have made on this crane has exceeded the expectations we had for it."

For full information on the F-M Model 36 Diesel for powering mobile and stationary equipment of every type, address Department O921, Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill. 34 branches at your service throughout the United States.

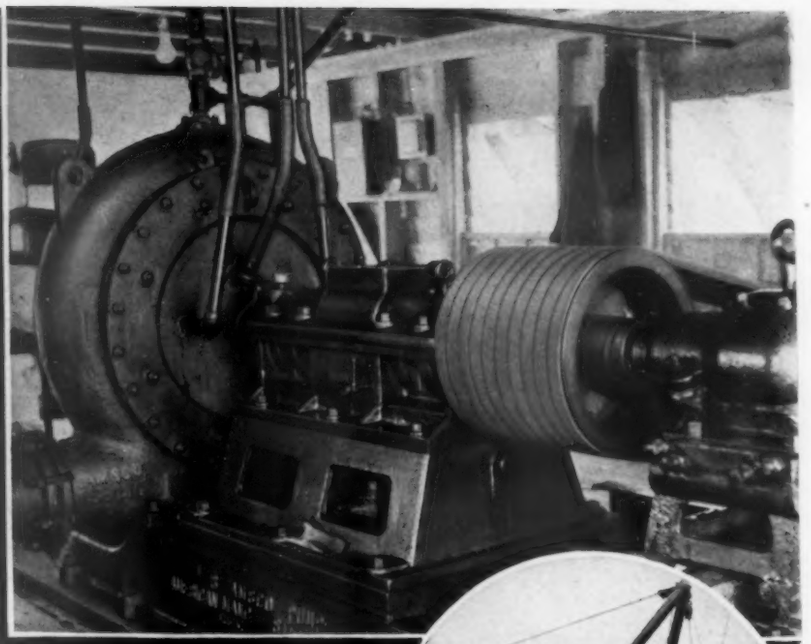
6853OA40.109

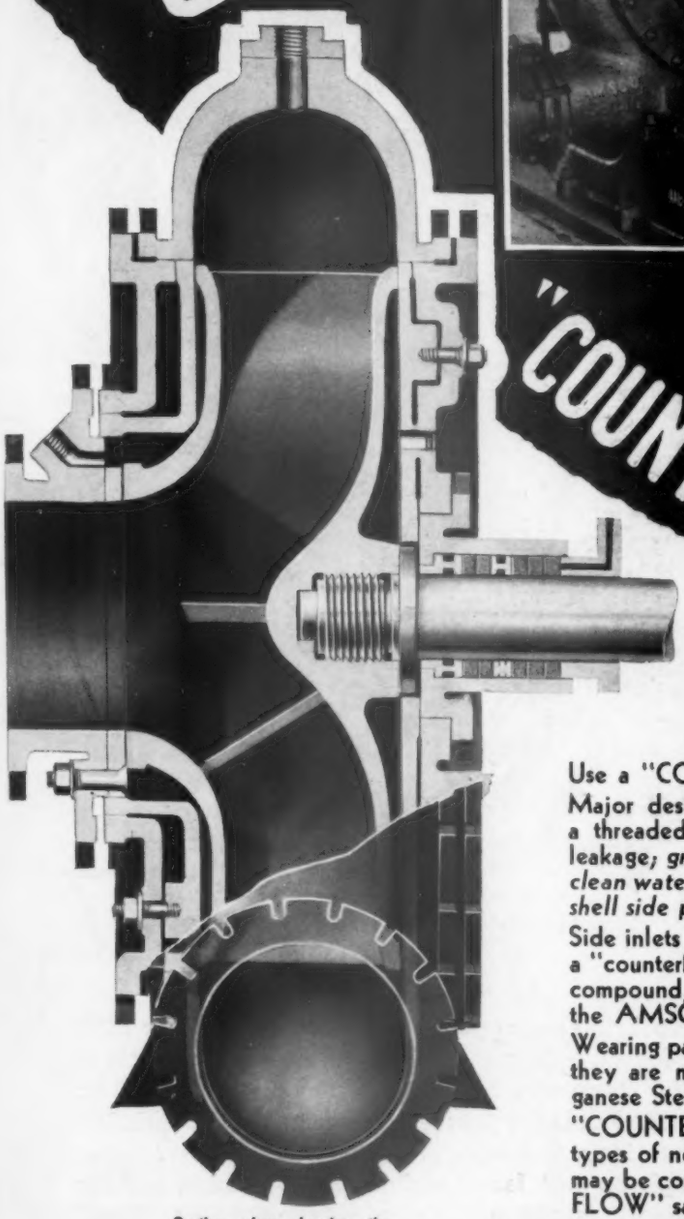
**FAIRBANKS-MORSE** F-M

106 YEARS OF PRECISION MANUFACTURING *Diesel Engines*

POWER, PUMPING AND WEIGHING EQUIPMENT

# AMSCO "COUNTERFLOW" PUMPS





Section view showing the funnel mouth impeller, the "COUNTERFLOW" clear water inlets and chambers, and the use of a threaded bore and drive shaft.

**Use a "COUNTERFLOW" Pump!**

Major design advantages include: a wide funnel mouth impeller; a threaded impeller bore and drive shaft; a minimum of internal leakage; *greatly reduced internal wear accomplished by introducing clean water, under pressure, between the impeller shrouds and the shell side plates.*

Side inlets introduce clear water between the shrouds and plates with a "counterflow" action, replacing sand-laden water which is a cutting compound, with clear water which is a lubricant — thus the name, the AMSCO "COUNTERFLOW" Pump.

Wearing parts afford maximum impact and abrasion resistance because they are made of "the toughest steel known" — AMSCO Manganese Steel.

"COUNTERFLOW" design is not only available in all sizes and types of new AMSCO Pumps, but almost all pumps now in service may be converted at nominal cost to take advantage of "COUNTERFLOW" savings.

Send for detailed information on "COUNTERFLOW" Pumps and data on how to increase the life of your old pumps by making "COUNTERFLOW" changes!

**AMERICAN MANGANESE STEEL COMPANY**

*Division of American Brake Shoe & Foundry Company*

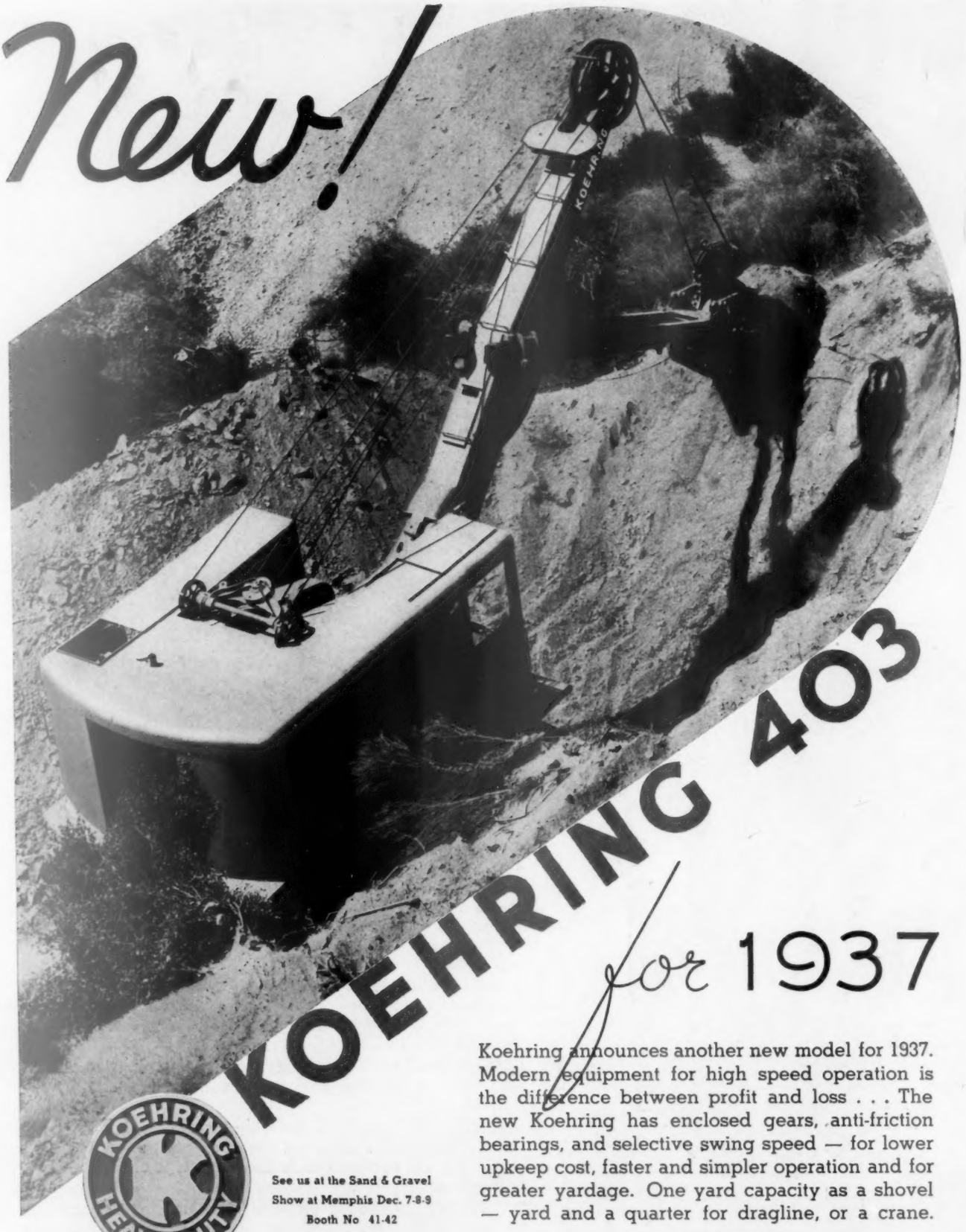
396 East 14th Street, Chicago Heights, Ill.

*Foundries at Chicago Heights, Ill.; New Castle, Del.; Denver, Colo.; Oakland, Calif.; Los Angeles, Calif. • Offices in Principal Cities*

**AMSCO**

TRADE MARK REGISTERED

# New!




## KOEHRING 403

## for 1937

Koehring announces another new model for 1937. Modern equipment for high speed operation is the difference between profit and loss . . . The new Koehring has enclosed gears, anti-friction bearings, and selective swing speed — for lower upkeep cost, faster and simpler operation and for greater yardage. One yard capacity as a shovel — yard and a quarter for dragline, or a crane.

New bulletins will be mailed upon your request.

KOEHRING HEAVY DUTY

See us at the Sand & Gravel Show at Memphis Dec. 7-8-9 Booth No 41-42

**KOEHRING COMPANY**

Pavers · Mixers · Shovels · Cranes · Draglines · Dumptors · Mud-Jacks

3026 WEST CONCORDIA AVENUE, MILWAUKEE, WISCONSIN

• *In* WASHINGTON, D.C.

# JAEGERS *are mixing* BETTER Concrete *at a Lower Cost!*

Day by day—year after year—Jaeger Truck Mixers are being proved by actual cost figures. In Washington, D.C., Jaegers have cost less than $1.00 per month per unit over a period of 7 years! In other cities, coast to coast, they're operating with equal economy—putting concrete in on the job in exact accordance with specifications—bringing their operators greater profit and more business.

Dual Mixing Speeds have solved the problem of long or short hauls—Man-Ten Alloy Steel cuts equipment weight, brings new strength and still longer life. One-man operation of mixing and discharge chute cuts time and delivery costs on every job. The exclusive Dual-Mix Action, with the Jaeger Double-End-Cone Drum, and the fastest discharge of any truck mixer, positively eliminate any chance of segregation. Jaeger features, designed into every detail, save money—save time—save man-power.

The demonstrated low operating costs and greater efficiency of Jaeger Truck Mixers are of prime importance to anyone now operating or contemplating the installation of a ready-mixed concrete plant. Write for the complete details and decide for yourself.

## Repair Bills For 7 YEARS -- *LESS than* $1.00 per month on Each JAEGER!

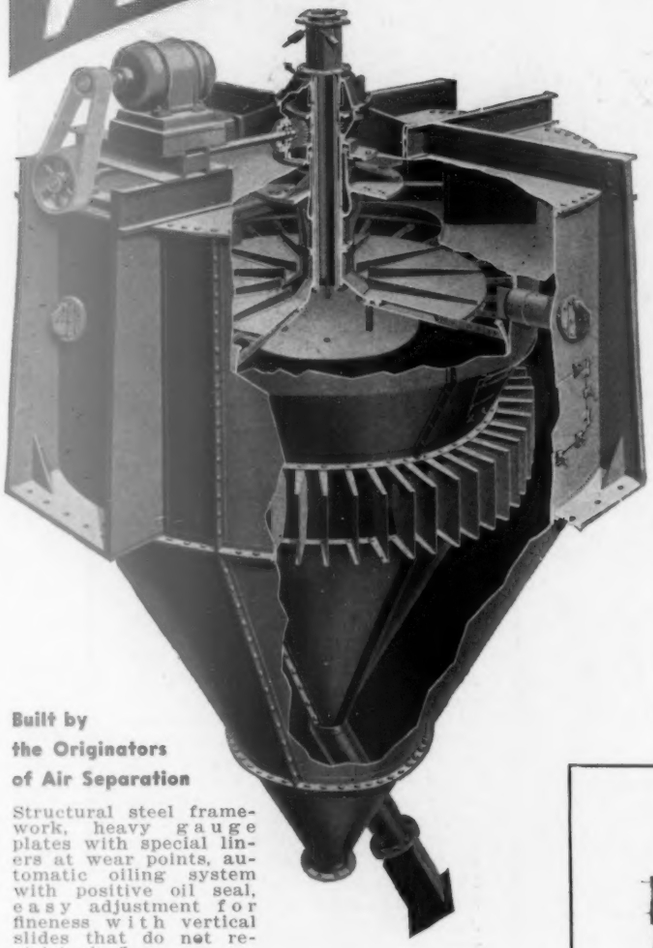
"Using 35 Jaegers. First 3, purchased in 1930, still operating every day. These are truck engine drive. Practically no major expense on them during 7 years. Drums, rollers and drive gears nearly as good as new. We have 32 of your mixers with separate engine drive, and the oldest, because of little wear and depreciation, will last many years more. Upkeep on the entire 35 mixers amounts to less than $1 per month per unit. Some haven't cost a cent for repairs in the past two years. Our last 4, delivered in the past 30 days, are certainly wonderful. 2-speed transmission considerably improves ease of operation. Are furnishing concrete on all classes Government work—no difficulty meeting most stringent specifications. Test made on our concrete far surpasses any requirements. Our next order will be for Jaegers." MALONEY CONCRETE CO., Washington, D. C.

THE JAEGER MACHINE CO.
602 DUBLIN AVENUE, COLUMBUS, OHIO

JAEGER TRUCK MIXERS

# WHIZZER SEPARATORS

## for Improving Cement Quality Increasing Mill Capacity Reducing Production Costs



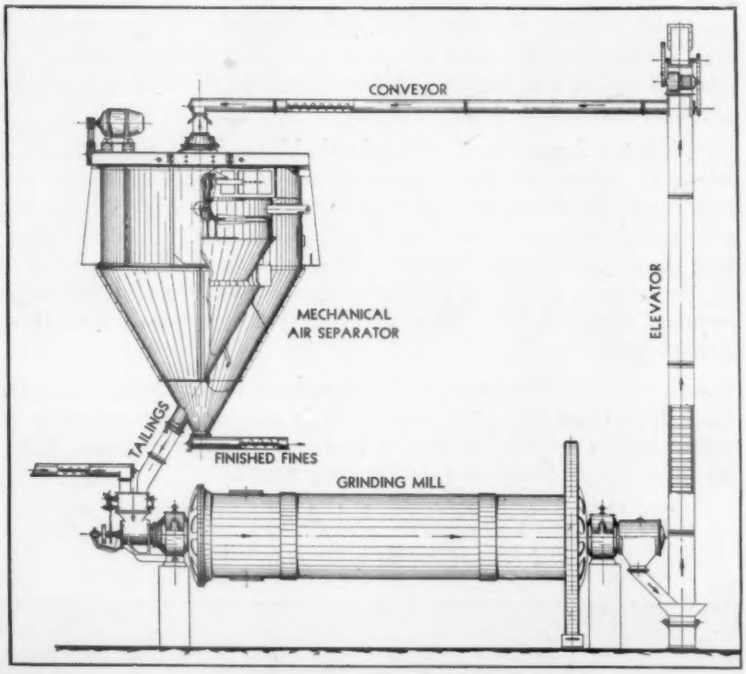
**Built by the Originators of Air Separation**

Structural steel framework, heavy gauge plates with special liners at wear points, automatic oiling system with positive oil seal, easy adjustment for fineness with vertical slides that do not restrict air flow.

THE effective **whizzer action** in the Raymond Mechanical Air Separator produces outstanding results on cement, as shown by recent reports from leading manufacturers. Where Raymond Separators are used for closed circuit grinding, the resultant gains over the former open circuit methods more than justify the installation by paying a big return on the investment.

In a plant making standard cement, a Raymond Separator operating with two com-peb mills has increased capacity by 32.6% and brought the specific surface area from 1500 to 1900. Another Raymond unit with six tube mills reduced power costs by 14% while boosting output 50%. For producing high early strength cement, the Whizzer Separator is setting a new standard of quality by insuring uniform particle sizes, high flour content, and exceptional strength tests.

*Write for details of this advanced design of separator —it offers more profitable production for 1937.*




Typical arrangement of Raymond Mechanical Air Separator with tube mill or ball mill for closed circuit grinding.

**RAYMOND**

**BROS. IMPACT PULVERIZER COMPANY**
Division of Combustion Engineering Co., Inc.
1321 North Branch Street, CHICAGO
Sales Offices in Principal Cities
Canada: Combustion Engineering Corp., Ltd., Montreal

PULVERIZING, SEPARATING, AIR DRYING AND DUST COLLECTING EQUIPMENT

# OVER FIFTY YEARS OF QUALITY WORKMANSHIP IS BACK OF EVERY LIMA

The fact that expert engineers incorporated in LIMA'S complete line of excavators many exclusive and advanced features that established new standards in design, is not the only reason they have proved the most popular shovel, dragline and crane on the market today.

Skilled mechanics, trained by an experience of over half a century in the quality workmanship required in locomotive construction; manufacturing facilities found only in a plant equipped to produce giant steeds of the rails; and an organization bearing an international reputation for service after sales, combine to make LIMA shovels, draglines and cranes the standard of quality wherever excavators are used.

## LIMA LOCOMOTIVE WORKS, INCORPORATED

SHOVEL AND CRANE DIVISION

LIMA, OHIO, U. S. A.

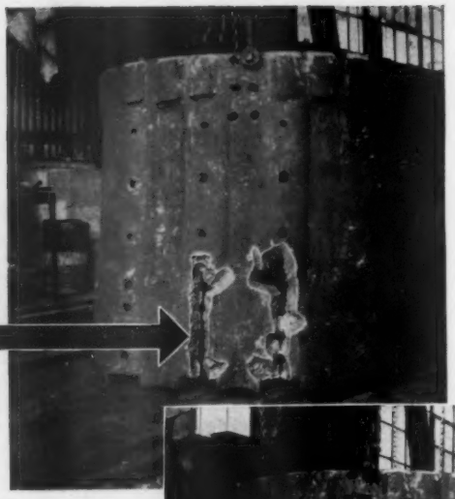
NEW YORK 167th St. and Sedgwick Avenue | CHICAGO 1543 Straus Bldg. | NEWARK, N. J. 317 Frelinghuysen Avenue | SEATTLE 2244 First Ave. So. | MEMPHIS 77 McCall Street | The General Supply Co. of Canada, Ltd. Ottawa, Ont. | Tyee Machinery Co. Ltd. Vancouver, B. C.

DALLAS—1304 McKINNEY AVE.

# LIMA

SHOVELS
DRAGLINES
CRANES

Repaired January 1934
has since handled 243,000 tons
*still going strong*



*welded with*

# TISCO TIMANG

## THE AIR-TOUGHENING MANGANESE STEEL WELDING ROD

Figure the saving yourself. Instead of relegating this dipper front to the scrap heap two years ago . . . or using repair methods which would be short-lived and of high overall cost . . . it was welded with genuine TIMANG Welding Rod. Today, the front is still in good condition . . . having moved 243,000 tons since the repair was made.

This is typical TIMANG service . . . which explains why TIMANG is so universally used for repairing and building up manganese and carbon steel castings and forgings. The TIMANG weld possesses the same manganese content as the parent metal. The rod flows easily, and the deposited metal does not require water quenching. Thus the finished weld is tough, strong and ductile . . . possessing the same resistance to wear as genuine TISCO Manganese Steel.

TIMANG is sold direct and through sales organizations. Your jobber or distributor handles this rod . . . in some cases under a private trade name. Be sure you insist on the Taylor-Wharton product for all needs. Bulletins on request.

TW

Other TISCO Products:

Manganese steel pump parts, cutter heads, dippers, buckets, dipper teeth, racks and pinions, jaw plates, cheek plates, hammers, liners, mantles, screen cloth, perforated plate, grinding balls, etc.

WRITE FOR BULLETINS

## TAYLOR-WHARTON IRON AND STEEL COMPANY

**HIGH BRIDGE, NEW JERSEY**

PLANTS AT HIGH BRIDGE, N. J.—EASTON, PA.

Offices:

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"TIMANG" (a registered trademark) Steel is patented in U.S.A. and foreign countries.

# QUESTION — WHY IS SO MUCH HEWITT CONVEYOR BELT *Specified?*

**ANSWER** . . . Only because the number of industrial buyers who keep complete records of performance is rapidly increasing. That means HEWITT conveyor belt is constantly adding new tonnage records to its score. HEWITT belt is built to "take it", produced under the most rigid standards by the company that makes industrial rubber goods exclusively. Behind the construction of every HEWITT conveyor belt is the direction of men who know your belt problems thoroughly and who draw from a treasure house of craftmanship to give you conveyor belt that stands up year in and year out, even under the most punishing service. Talk it over with one of HEWITT's distributors. They are listed in the classified telephone directories of major industrial centers under "Rubber Goods" or "Belting". And don't fail to find out about the HEWITT Proof Test Plan.

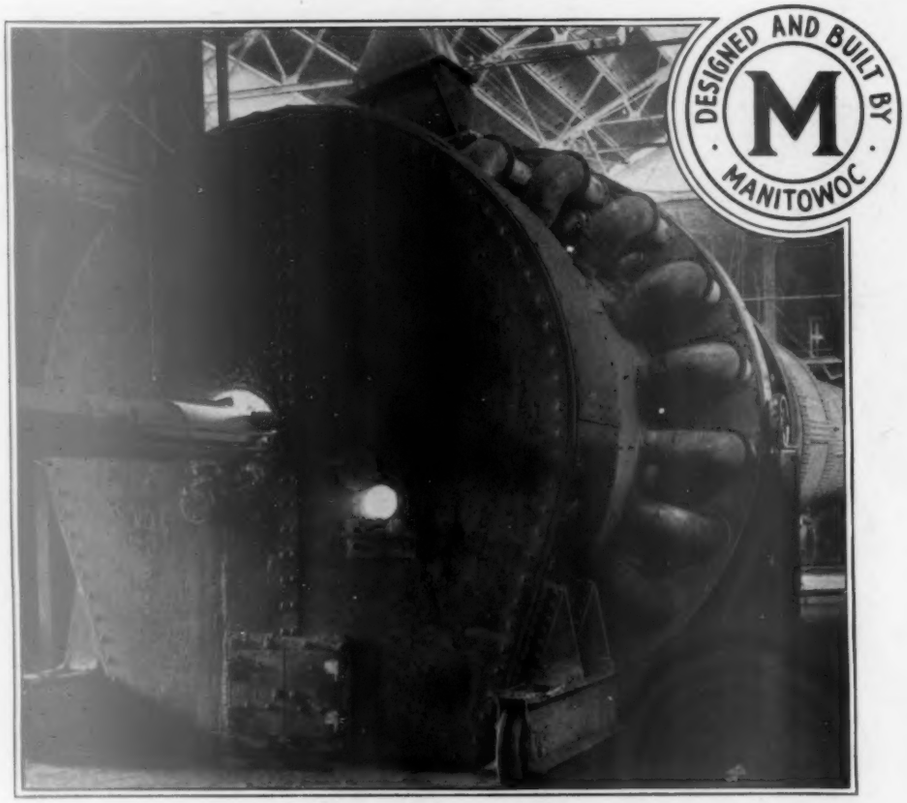
# HEWITT

**RUBBER CORPORATION**
**BUFFALO, NEW YORK**

HOSE • CONVEYOR AND TRANSMISSION BELTS • PACKING

# The Vanderwerp Recuperator

## for Rotary Kilns




**Correct in Principle**

**Proved in Practice**

The VANDERWERP RECUPERATOR alone meets the full requirements of kiln operators, assuring the ultimate in heat recovery from clinker and the maximum benefits from rapid air quenching.

**Because:** The heat exchange is made within the kiln, thoroughly insulated against radiation losses.

Air quenching is effected at the point of maximum temperature differential between clinker and cooling air.

The proof of these statements is perhaps best evidenced by the number of orders on hand, totaling twenty units in addition to those already in operation.

---

***Write, without obligation, for full particulars***

## MANITOWOC ENGINEERING WORKS

***Division of***

Manitowoc Ship Building Corporation

**GENERAL OFFICES AND PLANT**
**Manitowoc, Wisconsin**

**CHICAGO OFFICE**
**131 E. River St.**

# LORAINS—2 yd. to 3/8 yd.—Move More Material, Faster, at Less Cost

• On your sand and gravel operations, whichever of the 10 Lorain models, ranging from 2 yd. to 3/8 yd., is best suited to your production, will move more material, faster and at lower cost because every Lorain is built to the Center Drive design . . . Direct-to-the-point power application; turntables, simple and rugged, without a pound of excess weight; crawlers of a time-tested design, with 2 agile speeds; shovel booms that dig and dump at greater ranges . . . All backed by performance records that justify the statement that *"Center Drive is the Greatest Specification a Shovel or Crane Can Have."*

**THE THEW SHOVEL CO., LORAIN, OHIO**

**THE UNIVERSAL CRANE CO., LORAIN, OHIO**

# Most Modern Recuperative System of Preparing Pulverized Coal for Direct-Firing Cement Kilns

## Kennedy Air-Swept Tube Mill Gearless Type—Equipped with Automatic Level Control

Produces Continuous Supply of Superfine Pulverized Coal for Direct-firing Rotary Kilns

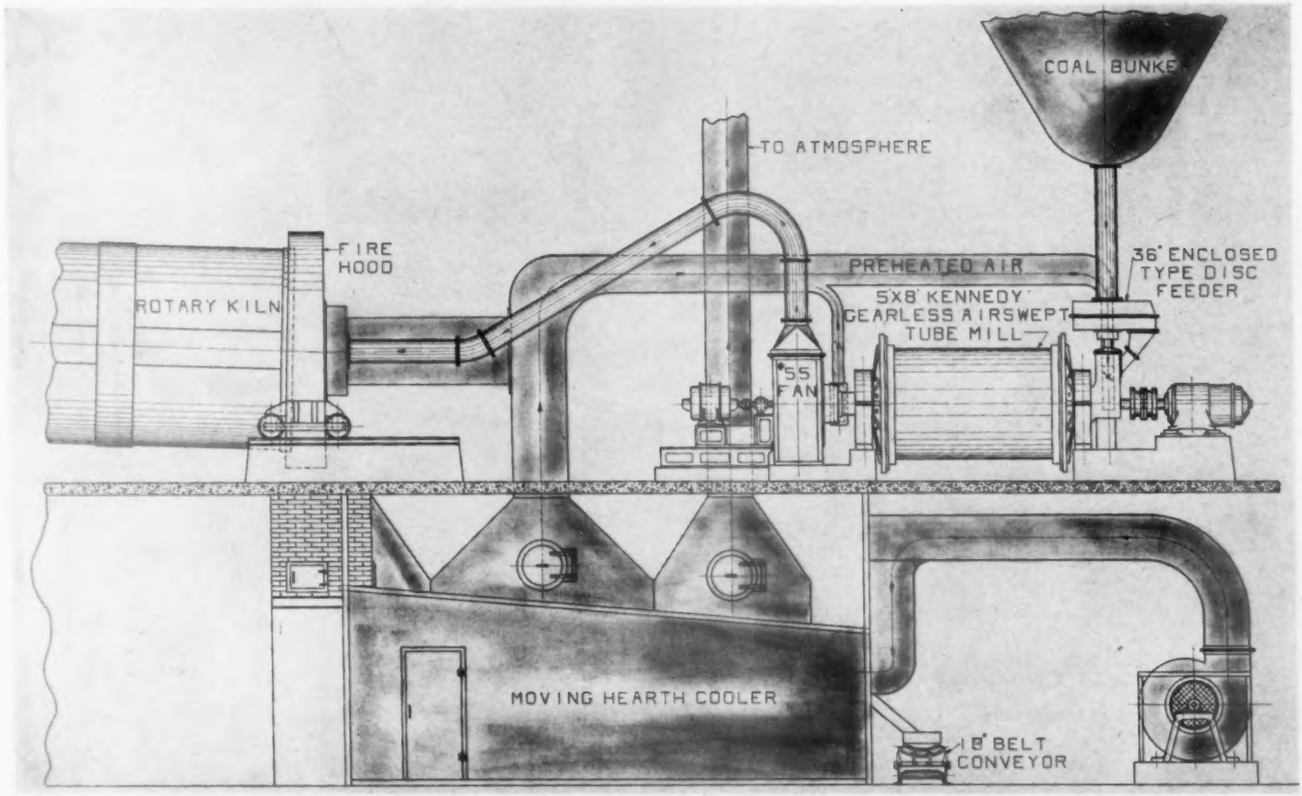
Reduces Coal Preparation Costs 30c to 50c per Ton Over Other Preparation Methods

Increases Kiln Production 5 to 15%

Has Low Power Consumption—16 to 18 K.W.H. per Ton

Has Low Maintenance Cost—Less Than 1c per Ton

## NOISELESS - DEPENDABLE - FOOLPROOF




*Wire or write for one of our engineers to call without obligation on your part.*

**KENNEDY-VAN SAUN MFG. & ENG. CORP.**

2 Park Avenue — New York, N. Y.

Sales Agents in all Principal Cities of the United States

# SHOVELS with

CUBIC 3/8 YARD

CUBIC 1/2 YARD

## DIGGING POWER Plus!

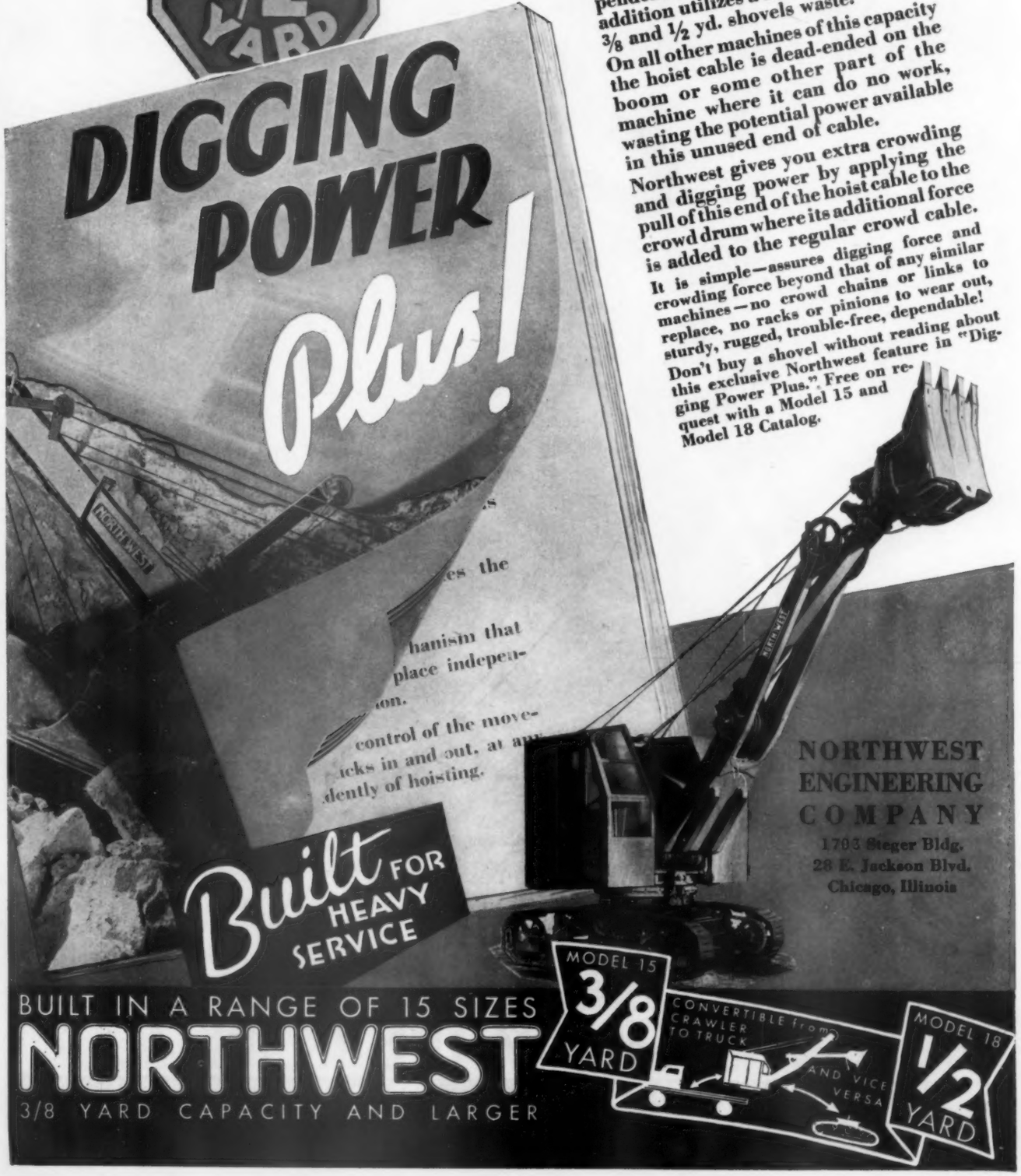
A quarry feature that is not found on other shovels of this capacity. It makes possible absolutely independent action of the dipper and in addition utilizes a force that all other 3/8 and 1/2 yd. shovels waste.

On all other machines of this capacity the hoist cable is dead-ended on the boom or some other part of the machine where it can do no work, wasting the potential power available in this unused end of cable.

Northwest gives you extra crowding and digging power by applying the pull of this end of the hoist cable to the crowd drum where its additional force is added to the regular crowd cable.

It is simple—assures digging force and crowding force beyond that of any similar machines—no crowd chains or links to replace, no racks or pinions to wear out, sturdy, rugged, trouble-free, dependable!

Don't buy a shovel without reading about this exclusive Northwest feature in "Digging Power Plus." Free on request with a Model 15 and Model 18 Catalog.




NORTHWEST ENGINEERING COMPANY
1703 Steger Bldg.
28 E. Jackson Blvd.
Chicago, Illinois

BUILT IN A RANGE OF 15 SIZES

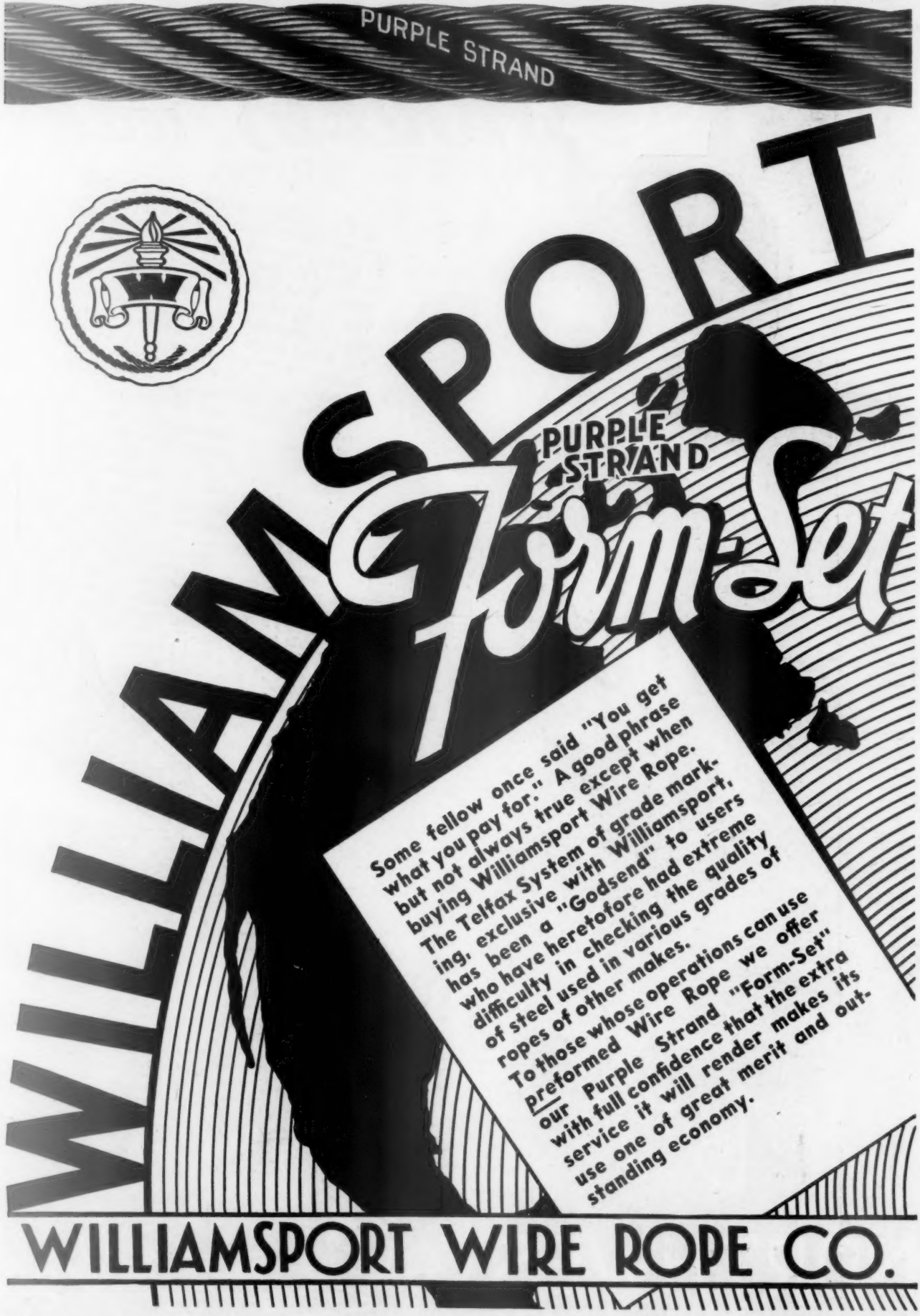
NORTHWEST

3/8 YARD CAPACITY AND LARGER

MODEL 15 3/8 YARD

CONVERTIBLE from CRAWLER TO TRUCK AND VICE VERSA

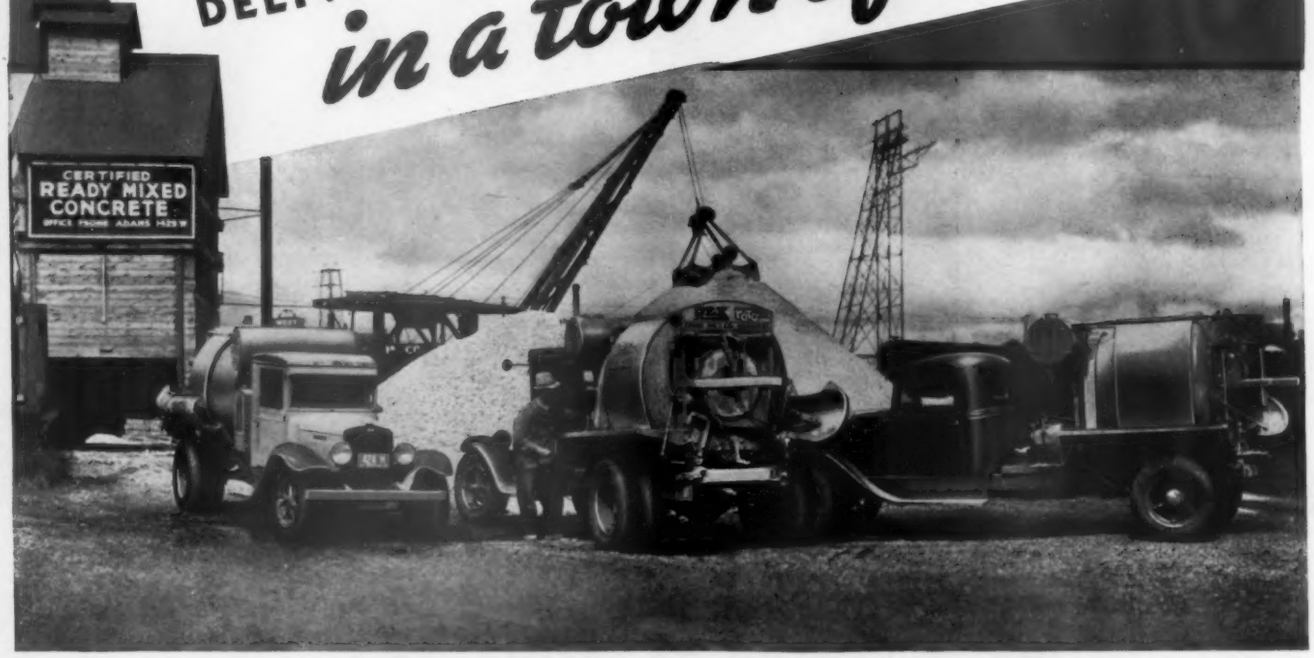
MODEL 18 1/2 YARD


PURPLE STRAND
WILLIAMSPORT
PURPLE STRAND
Form-Set
Some fellow once said "You get what you pay for." A good phrase but not always true except when buying Williamsport Wire Rope. The Telfax System of grade marking, exclusive with Williamsport, has been a "Godsend" to users who have heretofore had extreme difficulty in checking the quality of steel used in various grades of ropes of other makes.
To those whose operations can use preformed Wire Rope we offer our Purple Strand "Form-Set" with full confidence that the extra service it will render makes its use one of great merit and outstanding economy.
WILLIAMSPORT WIRE ROPE CO.

Williamsport, Pa. 122 So. Michigan Ave., Chicago, Ill.

*Other Offices in All Principal Cities*

# THEY STARTED WITH 1 AND NOW HAVE 3 REX MOTO-MIXERS DELIVERING READY-MIXED CONCRETE *in a town of 35,000*




*The Three Rex Moto-Mixers of the Certified Concrete Company of Green Bay*

Good business always watches for a profitable change. In 1935 the Duck Creek Quarry Company of Green Bay, Wis., didn't wait to see their sand, gravel, stone and cement business begin to fade away. They acted; they organized the Certified Concrete Company of Green Bay; bought one Rex Moto-Mixer and began to deliver ready-mixed concrete.

Today, in this community of 35,000 people, they are operating three Rex Moto-Mixers to supply the increasing demand for ready-mixed concrete. Their experience showed that Rex Moto-Mixers and Agitators actually mix and deliver sand, gravel, stone and cement the easiest and most profitable way.

You, too, can protect your business and get bigger and quicker profits from your sand, gravel, stone and cement by mixing and delivering ready-mixed concrete with Rex Moto-Mixers and Agitators. Investigate this proved path to quick profits; send for the free book, "Rex Moto-Mixers and Agitators." It tells you *how* to do it.

**CHAIN BELT COMPANY**
*OF* **MILWAUKEE**

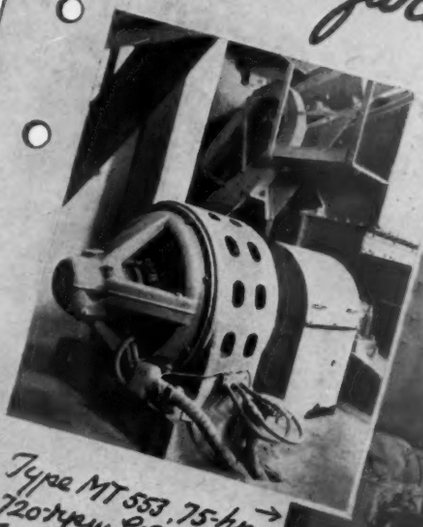
**REX** *Moto-Mixers*

**READY-MIXED CONCRETE**

Send today for a copy of the book—"Rex Moto-Mixers and Agitators." It describes the modern way to secure the profitable method of selling cement and aggregates. It illustrates the modern Rex Moto-Mixer features.

**CHAIN BELT COMPANY**
1646 W. Bruce Street Milwaukee, Wis.

Notes
Made on factory trip to
Nazareth Cement Company

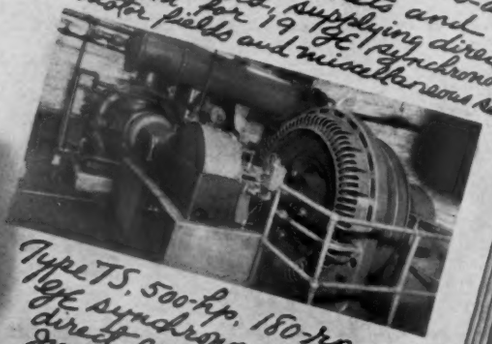


← Type Y 178, 400-hp, 720-rpm induction motor driving Hammer mill

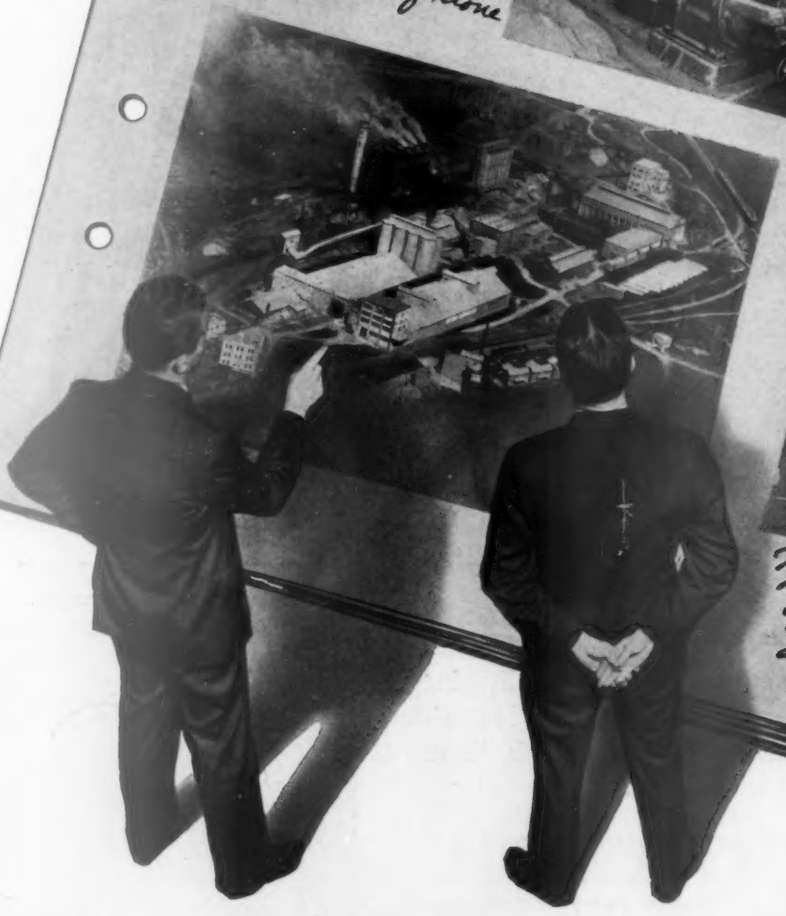
Type MT 564 200-hp, 720 rpm, GE induction motor operating rock crusher

Type MT 553, 75-hp, 720-rpm GE induction motor driving stone dryer →

One of two GE 200-hp, 600-amp motor-generator sets and switchboard, supplying direct current for 19 GE synchronous-motor fields and miscellaneous jobs



Type TS, 500-hp, 180-rpm GE synchronous motor direct connected to Ingersoll-Rand air compressor



GENERAL

# FACTORY TRIP REVEALS

# Nazareth Cement Co.

## *Increases Capacity and Efficiency with*

## GENERAL ELECTRIC EQUIPMENT

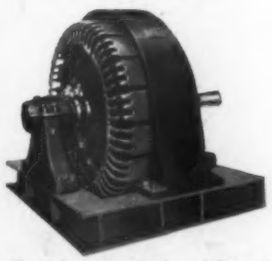
THE Nazareth Cement Company, Nazareth, Pa., pioneered in the complete electrification of the cement mill and, as a result, was able to operate efficiently at times when costs had to be kept at the absolute minimum.

The mill capacity was increased through the use of large synchronous motors designed by General Electric. These low-speed motors, direct connected to grinding mills, reduced maintenance costs and friction losses and provided greater safety. On the 15-tube mills the maintenance services of two men (full time) were made available for other purposes.

Further benefits which this progressive manufacturer receives from synchronous motors include greater flexibility in starting, and the maintenance of a unity-power-factor load in the plant. This improves the regulation and general operating efficiency of the mill.

General Electric not only manufactures a complete line of electric apparatus for cement mills and rock-products plants, but will gladly assist you in selecting electric equipment. Write for details and specific information on the latest types of apparatus. General Electric Company, Schenectady, N. Y.

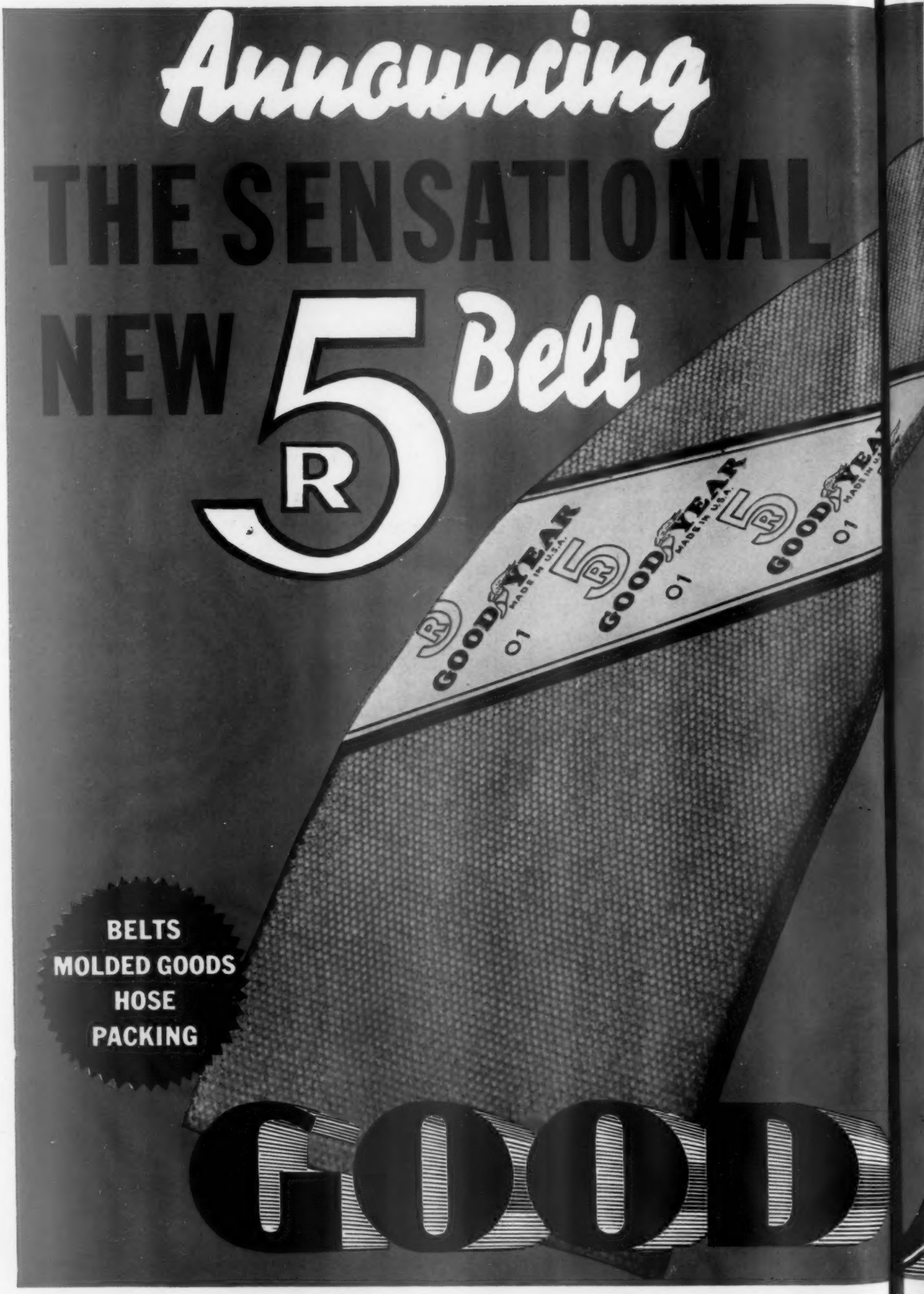
SAVE MONEY WITH G-E SYNCHRONOUS MOTORS



*For safe, economical, and dependable cement-mill drives for grinders, pulverizers, pumps, and compressors, choose General Electric synchronous motors. They are designed to fit the needs of your particular jobs*

011-125

# E L E C T R I C


Announcing
THE SENSATIONAL
NEW 5R Belt
GOODYEAR
MADE IN U.S.A.
5R
01
BELTS
MOLDED GOODS
HOSE
PACKING
GOOD



PRINT IN

WHY IT IS CALLED THE 5R
100 LBS. effective tension
SLACK SIDE TENSION
Ordinary Belt — 100 lbs.
Goodyear 5-R Belt — 25 lbs.
TIGHT SIDE TENSION
Ordinary Belt — 200 lbs.
Goodyear 5-R Belt — 125 lbs.

The "R" of a belt is the ratio between tensions on the tight or "pulling" side and slack or "returning" side necessary to maintain the effective tension required to operate the drive — and depends upon the coefficient of friction between belt and pulley. For example, an ordinary belt with an "R" of 2 must be operated at 200 lbs. tight side tension and 100 lbs. slack side, or a total of 300 lbs., to deliver 100 lbs. effective tension. The new Goodyear 5-R Belt is so named because its higher coefficient of friction gives it a minimum "R" of 5. To maintain an effective tension of 100 lbs., it requires a tight side tension of only 125 lbs. and 25 lbs. slack side, or 150 lbs. total — reducing bearing pressure and insuring longer belt-life.

# Pulls heaviest loads at 25% to 50% lower tension without slip!

AFTER years of research Goodyear engineers present a revolutionary development in flat transmission belting — a square-edge fabric belt with a *permanent minimum ratio of tension*, or "R," of 5. Hence its name — the Goodyear 5-R.

What that means in terms of belt efficiency non-engineers will find explained in the adjoining diagram. Briefly, it handles any given load at 25% to 50% lower tension without slip and far less stretch!

### Highest coefficient of friction

The secret of the 5-R's amazing slack-tension operation is a new Goodyear-perfected non-rosinous rubber compound impregnated through the fabric which gives it a coefficient of friction — a pulley grip — *unexcelled in any other type of belt!* As the surface wears, new friction is exposed with all the grip of a new belt — a surface that will not chatter or ball-up.

Months of service in typical operations have conclusively demonstrated 5-R's ability to reduce power transmission costs. Armored with a permanent, high coefficient of friction 5-R attacks cost on two fronts. 1. *Lower tensions* in the belt itself, resulting in longer belt life and greater ability to hold fasteners. 2. *Reduced bearing pressure*, resulting in longer bearing life, less lubrication problems, less frictional losses. It is now available in roll lots in all popular sizes and widths. The G. T. M. — Goodyear Technical Man — will be glad to give you full data on this unique new belt. To bring him to your plant, write Goodyear, Akron, Ohio, or Los Angeles, California — or the nearest Goodyear Mechanical Rubber Goods Distributor.

THE GREATEST NAME IN RUBBER

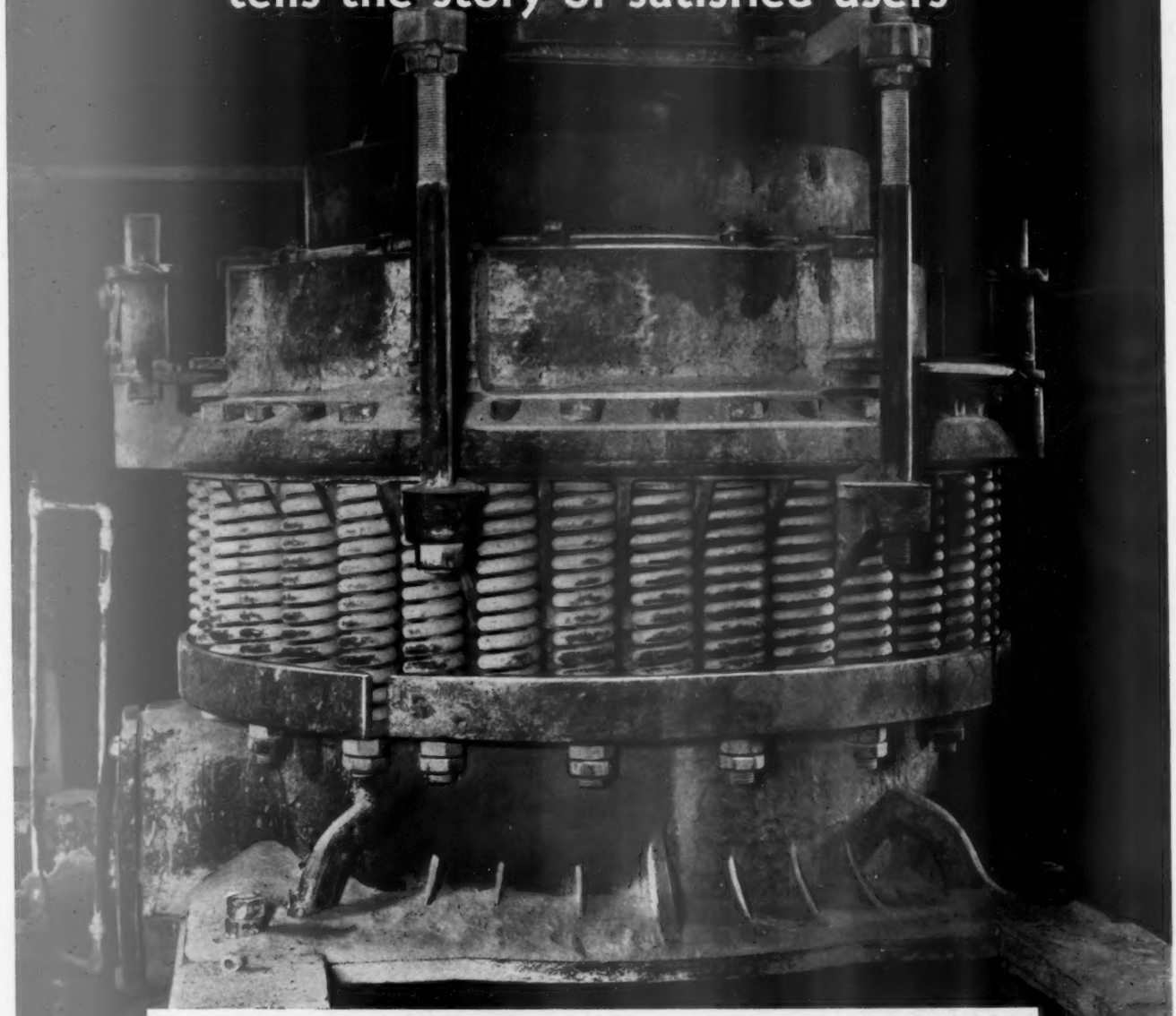
GOODYEAR



NT IN BINDING

# SYMONS CONE CRUSHERS

## The large percentage of repeat orders tells the story of satisfied users



After all, it is performance that counts. The fact that so many users of Symons Cones continue to purchase nothing else for their secondary crushing work, is evidence of the satisfaction which these crushers give. If any changes in reduction crushing equipment are being considered for next year's operations, install a Symons Cone. It assures the utmost in satisfactory performance, maximum tonnage of fine product and low crushing cost.

## NORDBERG MFG. CO. MILWAUKEE, WISCONSIN

NEW YORK CITY 60 East 42nd St. | TORONTO Concourse Bldg. | LONDON, W. C. 2 Bush House | MEXICO CITY Edificio Cook 413 | LOS ANGELES, CALIF. Subway Terminal Bldg.

# *"All our compressors are eminently Satisfactory"*

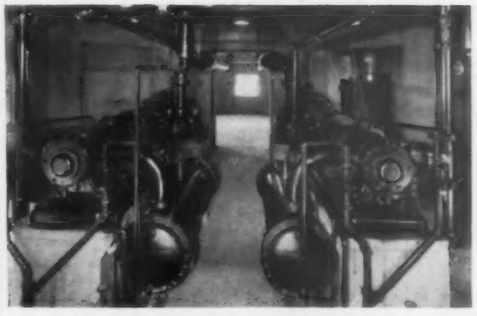
Our air compressors are located in the departments where air is required and we find that this arrangement has worked out in a very satisfactory manner. At present we have the following equipment of Fuller Rotary Compressors.

Quarry: One Two-Stage, Class C 50-16 Cap. 232 CFM
Cement Silos & Packing House: Four Single-Stage, Class C 120, Cap. 500 CFM
Slurry Agitation & Cement Transport: One Two-Stage, Class C 150-80, Cap. 750 CFM.

This distribution we have found to be advantageous. We all know that compressed air is an expensive commodity. As soon as the various departments have completed their daily cycle of operations, the compressors are shut down. This means a saving in power, supervision, maintenance, lubrication, and eliminates losses of transmission.

Our units operate every day for periods of from 8 hours to 24 hours, depending on the department they serve. In respect to maintenance cost, reliability in operation, and economy of lubrication, all our compressors are eminently satisfactory.

Kindest regards, we are,



**THERE isn't very much we can add to the above letter, written by one cement plant operator to another, making inquiry regarding his experience with Fuller Rotary Compressors.**

**The statements made merely confirm many others we have received during the past half dozen years . . . one operator tells us he has not made any repairs or replacements in five and one-half years, merely making inspections and cleaning about once a year. Due to simplicity of design this cleaning can be done in comparatively little time and at minimum expense.**

**It will pay you to investigate the merits of Fuller Rotary Compressors and Vacuum Pumps. Write for Bulletin C3-A.**

## FULLER COMPANY

**CATASAUQUA, PENNSYLVANIA**

**Chicago: 1118 Marquette Bldg.**
**San Francisco: 320-321 Chancery Bldg.**

C-14

FULLER-KINYON, FLUXO, AND AIRVEYOR CONVEYING SYSTEMS · · · ROTARY FEEDERS AND DISCHARGE GATES
ROTARY AIR COMPRESSORS AND VACUUM PUMPS · · · AUTOMATIC BATCH WEIGHERS · · · BIN SIGNALS

# The Year-After-Year Return

## By Ernest V. Madison

It is a day in December. The wind sweeps through the streets. The window panes seem to be mere conductors for cold air. We cannot get home because the street cars are stalled by the blizzard. So we turn to our neighbor at desk, machine or counter and say. **"Whew! This is regular Alaskan Weather."**

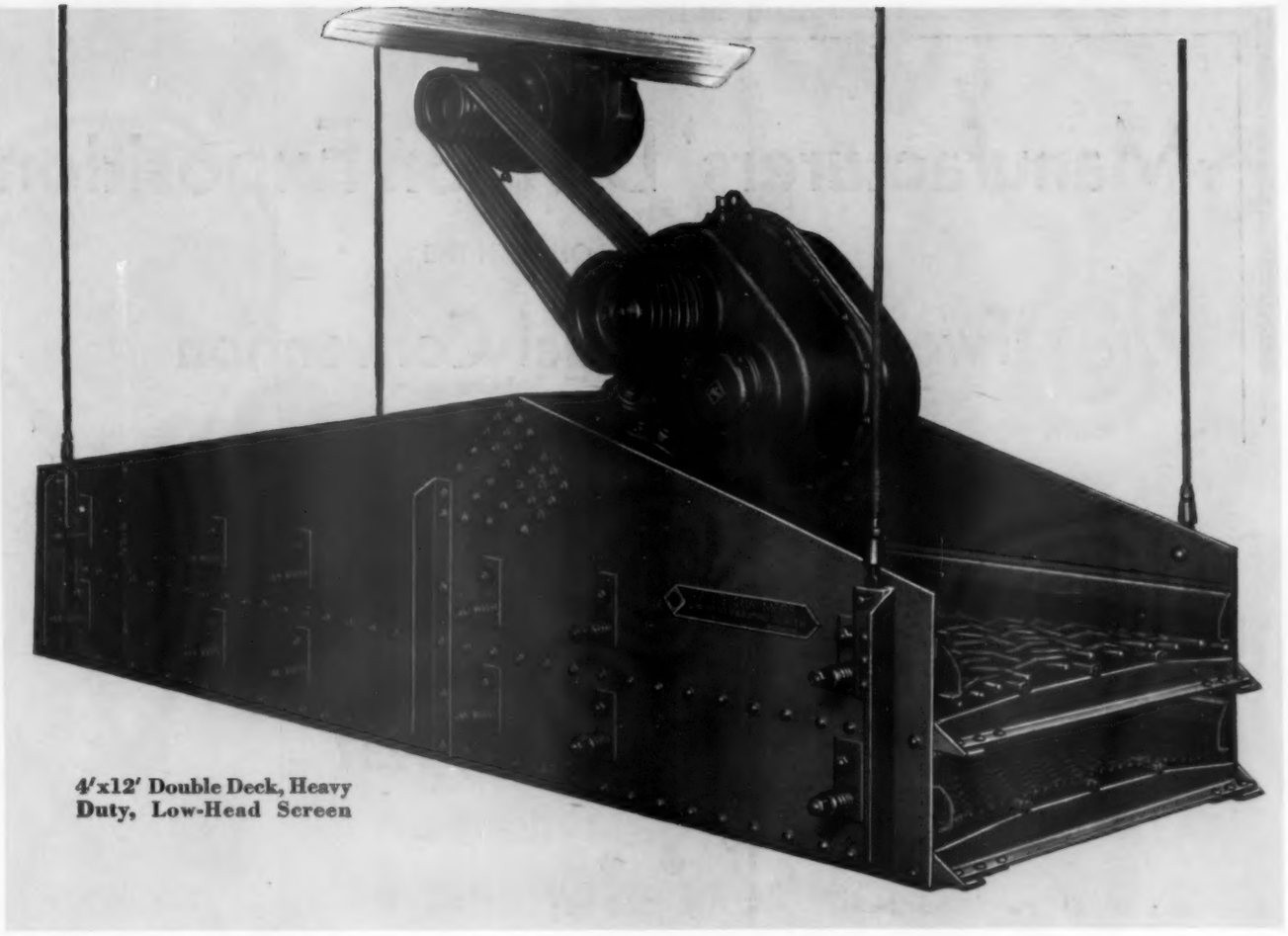
Always the Alaska of the popular mind has been the home of old Boreas, intense cold, and the scene of a dramatic gold rush. The milder climates and enormous undeveloped resources of sections of this territory are so unknown that for a long time a single company had no competition in harvesting its wealth.

Under United States ownership Alaska has paid a yearly return of more than its purchase price. In a single ten months $14,500,000 in gold alone was imported into the United States—more than twice the amount we paid for the territory. Other imports from her soil and waters brought the total up to almost $81,875,000. The return of more than eighty-one millions of dollars is eleven times the purchase price—a worth while year-by-year return.

Just as the purchase money invested in Alaska has brought a large year-after-year return to the United States, so does money invested in advertising in this paper bring year-after-year dividends—to both the advertisers and their customers.

The advertisements in **PIT AND QUARRY** influence readers to become customers of the advertiser. Their patronage calls for a larger production, which in turn lowers the cost of making **per article** enabling the advertiser to sell at a lower cost—a year-after-year return to his customers.

The advertiser wants to hold these customers which his advertising in **PIT AND QUARRY** has brought. He knows that it will require a feeling of absolute satisfaction to bring them back for reorder purchases. And, therefore, he will give his biggest value for the price charged that he may receive the year-after-year return from their patronage.



4′x12′ Double Deck, Heavy Duty, Low-Head Screen

# Low Headroom - Large Tonnages

**Small space and low production . . . they need no longer be linked together, especially in regard to screening operations. The new Low-Head Screen requires a remarkably low head room but at the same time is capable of high production. It eliminates expensive changes in plant layout and construction and at the same time gives you the needed extra capacity.**

**Like other Allis-Chalmers vibrating screens, the Style B Centrifugal and the Aero-Vibe, the Low-Head is cable and spring suspended; is mechanically strong; and has high screening efficiency, with low power consumption. They are built in sizes ranging from 3′x6′ to 6′x14′ with single, double or triple decks. Write for Bulletin 1478.**

**A-C ENGINEERED**

Blowers, Compressors, Vacuum Pumps.
Cement Making Machinery, Rock Crushers, Screens, Roadbuilding Equipment.
Centrifugal Pumps.
Electric Generators, Transformers, Converters, Rectifiers, Switchgear and Regulators.
Electric Motors for all purposes.
Farm Machinery, Road Machinery, Farm and Industrial Tractors.

EQUIPMENT ENGINEERS TO INDUSTRY

ALLIS • CHALMERS

MILWAUKEE WISCONSIN

**A-C ENGINEERED**

Flour, Feed and Flaking Mill Machinery.
Hydraulic Turbines and Accessories.
Mining, Metallurgical and Hoisting Equipment.
Sawmill and Timber Preserving Machinery.
Steam Turbines, Steam Engines and Condensers.
Texrope Drives.
Water Wheels and Accessories.

*Bulletins for various types of equipment furnished on request. Address Allis-Chalmers Mfg. Company, Milwaukee, Wisconsin*

# Manufacturers' Division Exposition

IN CONJUNCTION WITH THE

## Twentieth Annual Convention

OF THE

## National Crushed Stone Association

Netherland Plaza Hotel — Cincinnati, Ohio

**January 18, 19 and 20, 1937**

• •

• • AN EXCELLENT opportunity for manufacturers of machinery, equipment and supplies used in the production of crushed stone to bring their products to the intimate attention of the foremost producers of the United States and Canada and under particularly favorable circumstances.

• •

FOR FULL INFORMATION, WRITE TO

## National Crushed Stone Association

1735 Fourteenth Street, Northwest

Washington, D. C.

# WHEN WINTER COMES!

THE GRASSHOPPER CURLS UP AND DIES.-
THE BEAR CURLS UP TO GO TO SLEEP.—
THE SQUIRREL CURLS UP HIS TAIL AND CHATTERS DEFIANCE TO THE COLD:-
THE DUCK FLIES SOUTH.—
THE MODERN PRODUCER GETS HIS EQUIPMENT READY FOR NEXT YEAR.

● THIS WISE PRODUCER CHECKS OVER HIS EQUIPMENT---REPLACES OBSOLETE SCREENS -- INSTALLS NEW EFFICIENT REDUCTION CRUSHERS AND COMPLETELY MODERNIZES HIS PLANT.

WE HAVE HELPED OTHERS --
WE CAN HELP YOU.---

HAVE YOU SEEN THE NEW **PIONEER** HORIZONTAL GRADATION SCREEN ?

CHECK AND SEND THIS COUPON.

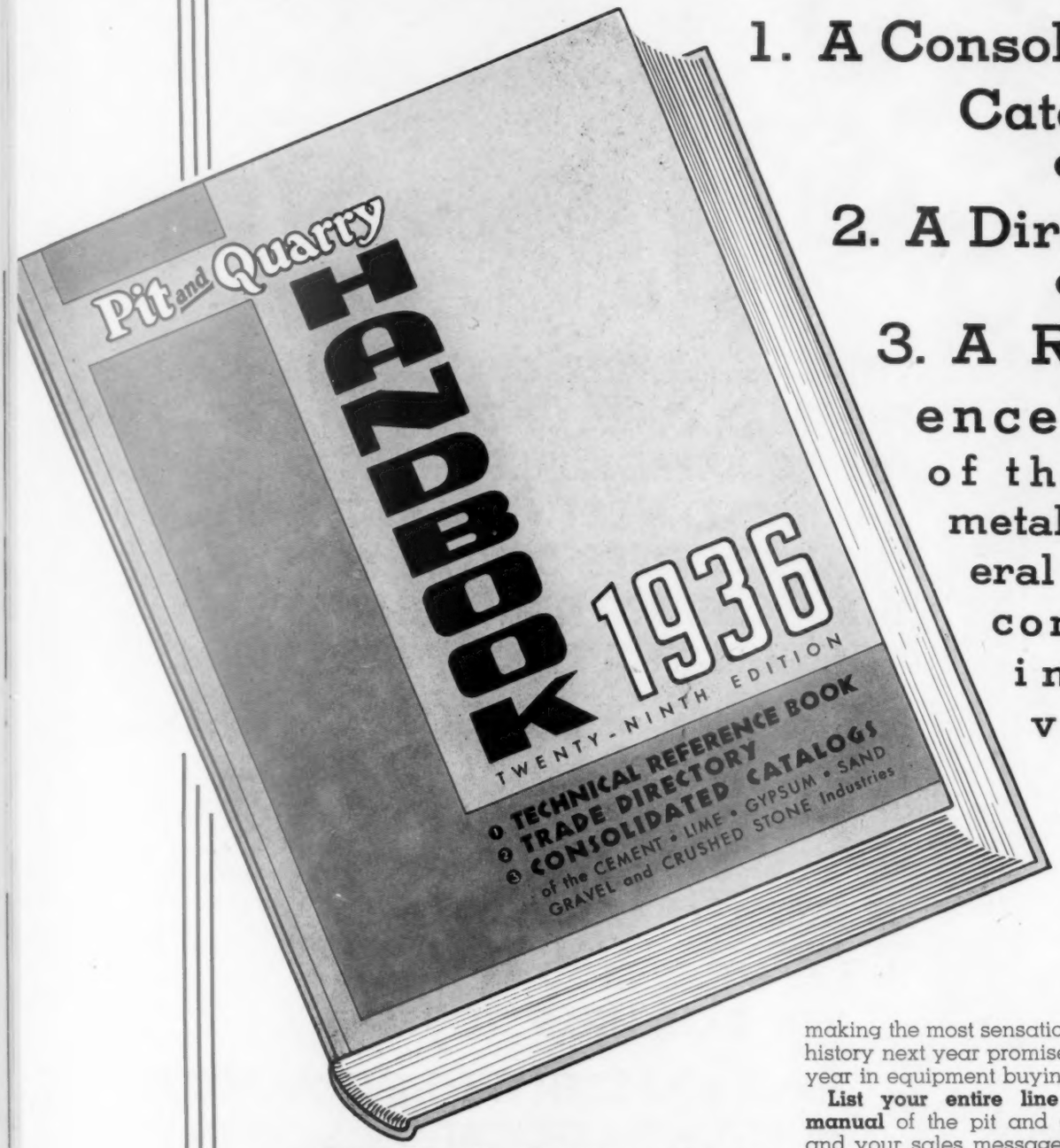
PIONEER GRAVEL EQUIPMENT MFG. CO.
1515 Central Ave., Minneapolis, Minn.
Gentlemen:
We are planning to modernize our equipment in preparation for 1937 business. Tell us about your —

- ☐ Jaw Crushers
- ☐ Horizontal Gradation Screens
- ☐ Vibrating Screens
- ☐ Conveyor Units
- ☐ Washing Plants
- ☐ Roll Crushers
- ☐ Sectional Conveyors
- ☐ Quarry Plants

Name .....
Address .....
Town ..... State .....

**PIONEER GRAVEL ROCK EQUIPMENT**

# TRIPLE ATTENTION VALUE




## 1. A Consolidated Catalog

•

## 2. A Directory

•

## 3. A Reference Book of the non-metallic mineral industry combined in ONE volume

THE one and only directory, reference book and combined catalog for non-metallic-mineral producers.

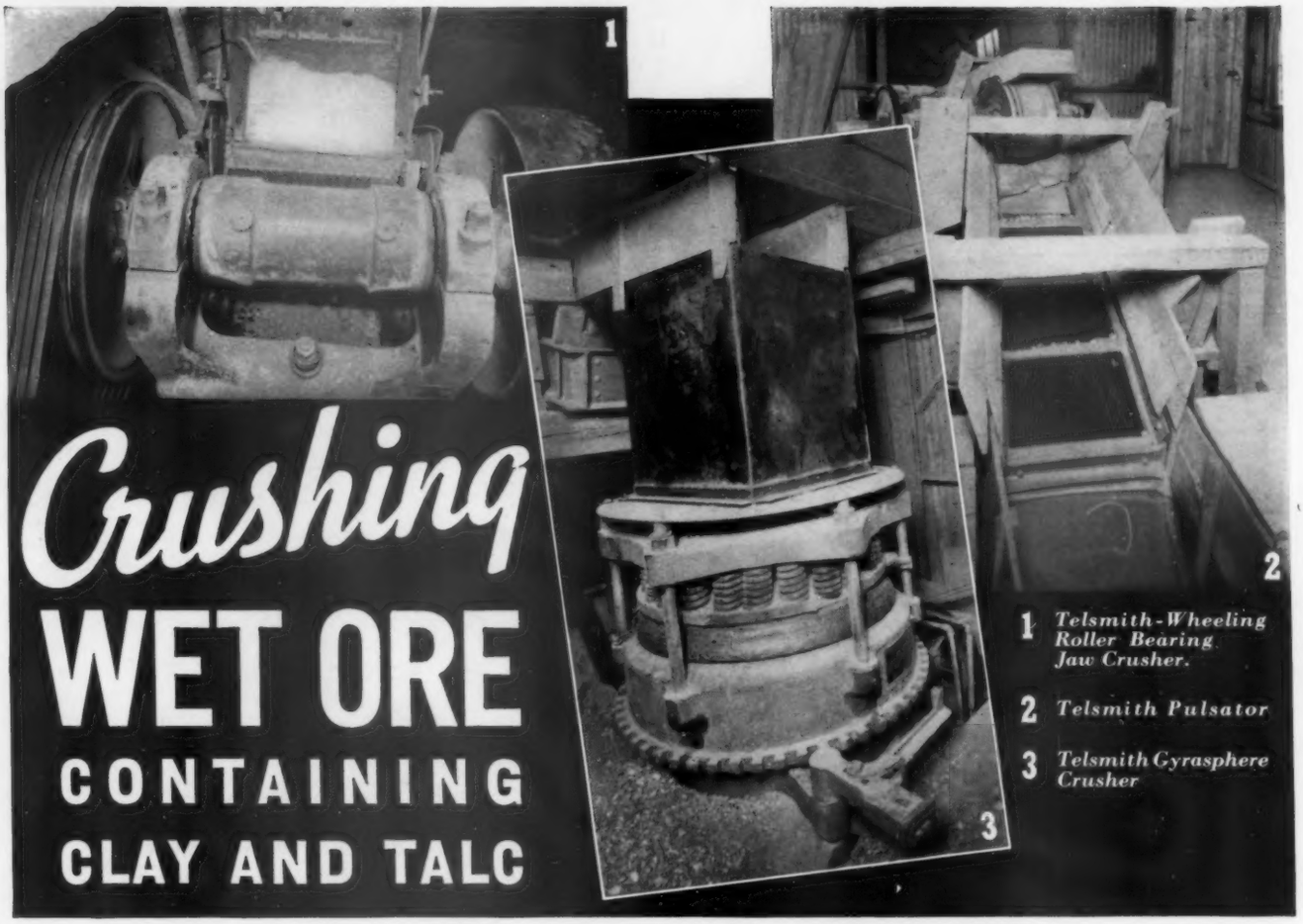
**Build your sales campaign on a solid foundation** by using **PIT AND QUARRY HANDBOOK** as the basis of your advertising. With the durable goods industries making the most sensational come-back in history next year promises to be a banner year in equipment buying.

**List your entire line in this buying manual** of the pit and quarry industries and your sales message will go to every prospect who authorizes or approves purchases in the 4,700 producing plants in the industry.

**Act now to get the maximum discounts offered** for sending in early copy and to get good location for your catalog pages, which are assigned in the order received.

## PIT AND QUARRY PUBLICATIONS

**538 South Clark Street** **Chicago, Illinois**




# Crushing WET ORE CONTAINING CLAY AND TALC

1 *Telsmith-Wheeling Roller Bearing Jaw Crusher.*

2 *Telsmith Pulsator*

3 *Telsmith Gyrasphere Crusher*

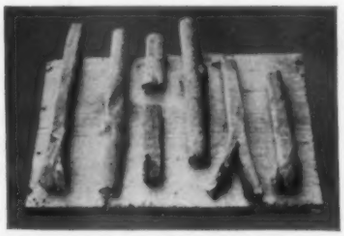
To develop their Comet Mine, the Basin-Montana Tunnel Co. of Basin, Montana, after the most careful investigation, selected Telsmith crushing equipment. Operation, begun early in 1934, has been continuous. The mill is now operating at 200 tons per day, with an ample margin of surplus crushing capacity.

The metals mined are zinc, lead, silver and copper, with some gold. Ore is very hard and abrasive. Much of the rock is wet, containing clay and talc, making a difficult crushing problem.

Ore from the mine first passes through a 9″ x 30″ Telsmith-Wheeling Roller Bearing Jaw Crusher and is crushed to about minus 1½″. Then it is conveyed to a 2′ x 6′ Telsmith Single Deck Pulsator, with ⅜″ square openings in screen cloth. Oversize from this vibrating screen goes to a No. 24 Telsmith Gyrasphere Crusher originally set to deliver minus ½″, now minus ⅜″ product. According to the management this Gyrasphere has given excellent service . . . crushing from 5700 to 11,000 tons of ore with one set of manganese wearing parts, this wide variation being due to the change in adjustment. Oiling system is positive, without dust seal failures. Repair expense is moderate; mechanical performance has been satisfactory; and power consumption low. The Basin-Montana people report, "We like Telsmith equipment."

*Write for descriptive Bulletins*—Y-15 Telsmith Gyrasphere Crusher; W-15 Telsmith-Wheeling Jaw Crusher; V-15 Telsmith Pulsator.

**TRAMP IRON DOES NOT STOP TELSMITH**



*Actual photograph of tramp iron which passed through both Telsmith Jaw Crusher and Gyrasphere Crusher in plant of Basin-Montana Co., yet failed to damage either crusher in any way.*

**SMITH ENGINEERING WORKS, 504 E. CAPITOL DRIVE, MILWAUKEE, WIS.**

Associates in Canada: Canadian Ingersoll-Rand Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver. M-5

50 Church Street, New York City
81 Binney St., Cambridge, Mass.

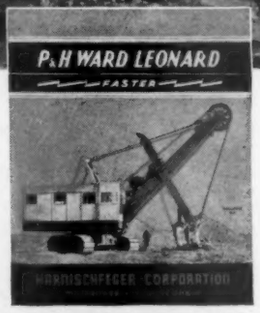
201 N. Wells, Chicago, Ill.
412 Westinghouse Bldg., Pittsburgh, Pa.

1013 Commercial Trust Bldg., Philadelphia, Pa.
Abrams-Anderson Co., Detroit, Mich.

**TELSMITH**

# NOT ONLY *Faster* BUT *Easier* TO RUN

In all kinds of open-pit operations, the P&H Ward-Leonards show up with the higher production that means lower costs on every ton of material moved. This faster digging cycle is due not only to mechanical improvements, but because the machine itself is so much easier to operate with simple electrical controls for every movement in travel and digging . . . a true one-man machine . . . the first of its kind. . . . . Your investigation will bear proof of the fact that the P&H Ward-Leonard is able to dig 15% more than any other machine of its size under similar conditions.




*The engineering story behind the P&H Ward-Leonards is fully covered in this new Bulletin X-9. Your copy will be forwarded upon request.*

**HARNISCHFEGER CORPORATION**

**4451 West National Avenue** *Established 1884* **Milwaukee, Wis.**

MAR 20 1937
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Vol. 29 DECEMBER, 1936 No. 6

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Published on the tenth of each month for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel and other nonmetallic minerals. Copyrighted 1936 by Complete Service Publishing Co., 538 South Clark Street, Chicago, Ill.

•

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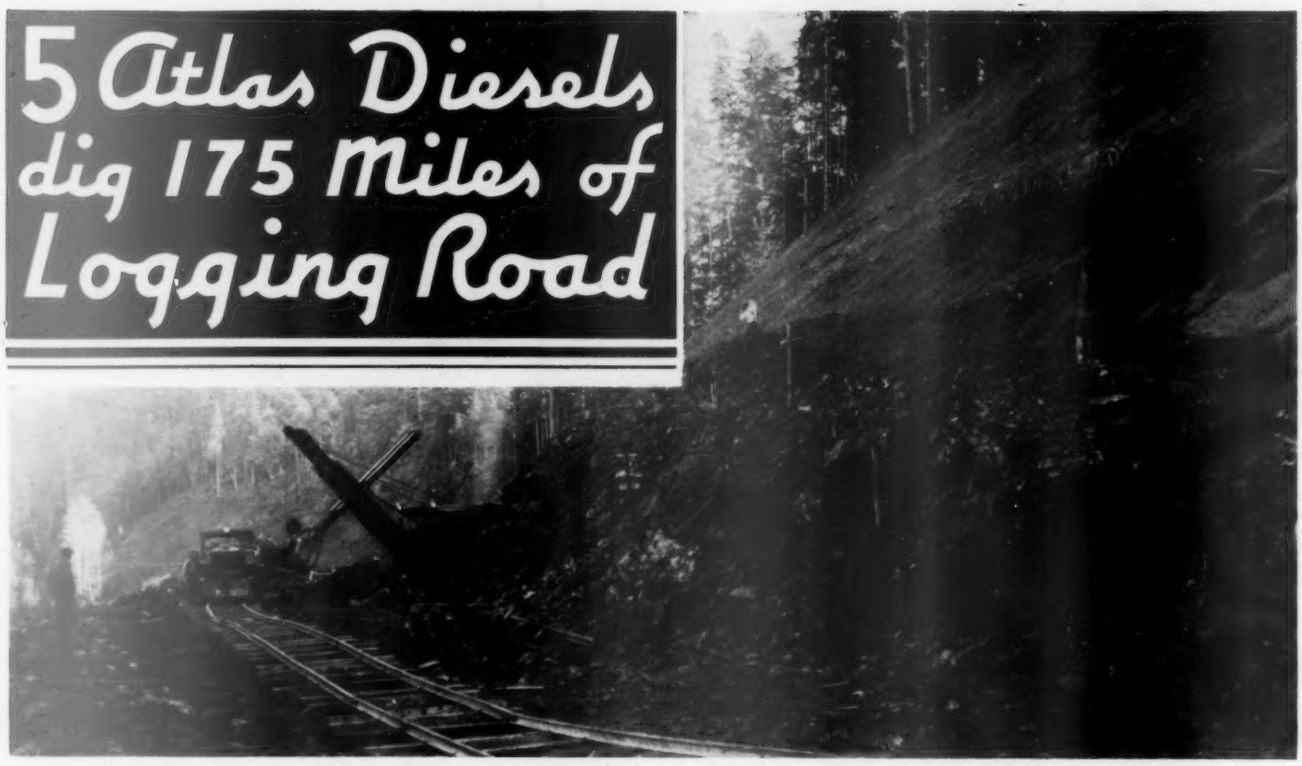
# 5 Atlas Diesels dig 175 Miles of Logging Road



Out in the Pacific Northwest, extensions of logging railroads are continually being made in advance of the loggers so that when one stand of timber has been harvested, the logging railroad will have been built to haul to the mill the logs that a new stand will yield. Most of this construction is in mountainous areas where the going is mighty tough.

During the past eight years, five Atlas Diesel powered P. & H. Shovels have excavated 175 miles of such logging road for the largest lumbering operation and logging show in the Northwest. The first two shovels were bought in 1927, two more were put to work in 1928 and the fifth went into the woods in 1929. All have worked continuously, and about half the time on double shift.

All of their work has been hard construction, a great deal of it through solid rock—just the kind of work it takes to show what shovels are made of. Loggers, like building contractors, do not "baby" their equipment. It has to be able to "take it" if it is to stay in the woods.

The performance of these five Atlas Diesel powered shovels has been outstanding, their operating cost has been low and maintenance negligible. Besides these tangibles, Atlas Diesels do not emit flying sparks that start forest fires, nor do they present the water problem that is always incident to steam rigs. The trend in the woods is definitely toward Diesels and in power excavators you'll find more Atlas Diesels than the engines of all other Diesel manufacturers combined. Write for a copy of our catalog which covers the application of Diesel power to nine specific industries.

ATLAS IMPERIAL DIESEL ENGINE CO.

OAKLAND, CALIFORNIA MATTOON, ILLINOIS

# ATLAS IMPERIAL

## Four Meet Death in St. Louis Plant Fire

**ALL TRAPPED WITHOUT CHANCE**

Four persons were burned to death when they were trapped on the top of the plant structure during a sudden and terrifying blaze at the plant of the Fred Schmitt Material Co., St. Louis, Mo., on Nov. 4. Those who met death were:

Fred Schmitt, Jr., son of the president.

Vance Wright, an inspector of the Missouri Highway Dept.

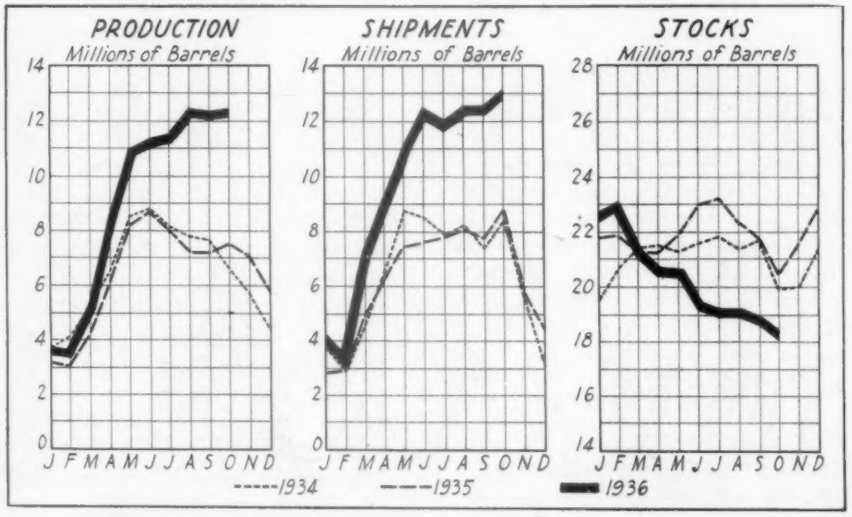
Donald A. Fyfe, sales-manager of the company.

T. R. Carroll, elevator operator.

The four men had gone to the top of the structure and were inspecting sand and gravel in storage and the operation of an elevator when there was an explosion in the office below where a gasoline stove had been burning. Flames leaped upward quickly and swept away a frame stairway, cutting off their only means of escape.

The company is one of St. Louis' leading producers of ready-mixed concrete and ready-mixed mortar.

## CEMENT SALES, OUTPUT HIT PEAK




*The Portland-cement industry in October, 1936, produced 12,470,000 bbl., shipped 13,089,000 bbl. from the mills, and had in stock at the end of the month 18,119,000 bbl. Production and shipments of Portland cement in October, 1936, showed increases, respectively, of 66.0 and 48.8 per cent., as compared with October, 1935. Portland-cement stocks at mills were 11.6 per cent. lower than a year ago.*

*The statistics here given are compiled from reports for October, received by the Bureau of Mines, from all manufacturing plants except three, for which estimates have been included in lieu of actual returns.*

*The mill value of the shipments—83,700,000 bbl.—in the first nine months of 1936, is estimated as $127,095,000.*

*According to the reports of producers the shipments totals for the first nine months of 1936 include approximately 2,176,000 bbl. of high-early-strength Portland cement with an estimated mill value of $4,168,000.*

*Operations were at 56.0 per cent. of capacity in October.*

## E. J. Maguire Dies of Sudden Heart Attack

**WAS CEMENT INDUSTRY PIONEER**

The entire Portland-cement industry was shocked to learn of the sudden death of E. J. Maguire, vice-president and treasurer of the Medusa Portland Cement Co., on the evening of Nov. 10 at Cleveland, O. Heart attack was the cause.

Mr. Maguire was one of the veterans of the cement industry in the United States. His first connection came in 1896 when he became secretary to Arthur Newberry, president of the old Sandusky Portland Cement Co. A year later he was appointed secretary of the concern and in 1913 also assumed the duties of assistant treasurer. He was made secretary-treasurer in 1920. Shortly after the Sandusky company became the Medusa Portland Cement Co. in 1929, Mr. Maguire was made vice-president and treasurer, the position he held at the time he was stricken.

Officials and a number of employees of the company and other guests had gathered at Cleveland on July 13 of this year to attend a testimonial dinner in his honor, the occasion being the fortieth anniversary of his joining the company.

Burial was at Cleveland on Friday, Nov. 13.

## PCA Engineer Resigns; Joins Columbia Faculty

For a number of years regional structural engineer for the New York district of the Portland Cement Assn., R. R. Zipprodt has resigned to become associate professor of civil engineering at Columbia University. He has been succeeded by Alexander J. Yeats, formerly a structural field engineer in the Boston territory, who assumed his new duties in November.

## Gravel Assn. Board Drafts Amendments

### ACTION AT MEMPHIS CONVENTION

At the semi-annual meeting of the National Sand & Gravel Assn. Board of Directors in St. Paul on July 9 and 10 it was agreed that the constitution of the association was in need of revision in order to clear up certain ambiguities which existed in the present constitution, to define more clearly the functions of the association, and to reconstitute the board of directors in a more practical and representative manner. Accordingly, a committee was appointed to prepare a report on a revision of the Constitution, with the following personnel; Messrs. Alex. W. Dann (chairman), W. Jess Brown, Robt. J. Potts, E. Guy Sutton, and H. E. West.

It is provided in the present constitution that any proposals for amendments shall be submitted to the membership not later than 15 days in advance of the meeting at which such amendments are to be acted upon. Pursuant to that requirement the report of the committee will be presented at the Memphis convention and the action taken thereon at that time will be final.

The objects of the association are stated in Sec. 3 of the proposed constitution to be: "To provide an instrumentality through which the members of the sand-and-gravel industry of the United States and the Dominion of Canada may coördinate their efforts in the handling of problems of common concern to the industry; to establish and to maintain the highest standards of business practices, customs and usages among its members; to protect and advance the interest of the sand-and-gravel industry; to represent and act for the industry before all divisions of government, and those public and private organizations whose work affects the sand-and-gravel industry; and, in general, to perform such acts and services for the industry and its members as may be more satisfactorily performed by group, rather than by individual, action."

The new constitution contains the following provisions regarding the board of directors:

"Art. V., Sec. 1.—The board of directors shall consist of one representative from each state in which the association has active members and one representative from the Dominion of Canada. Such representatives shall be elected at least 30 days prior to the annual meeting of the association and in such manner as the active membership in the respective states and in the Dominion of Canada shall determine. The board of directors shall further consist of three directors at large, elected by ballot at the annual meeting of the association; the president, vice-president, and treasurer of the association; two representatives of the Manufacturers' and Technical Division, hereinafter provided for; and past-presidents of the association.

"Sec. 2.—The board of directors shall choose from their own number four active members who, together with the president, vice-president and treasurer of the association, shall constitute the executive committee, which executive committee shall have the full authority of the board of directors during the interim between meetings of the board.

"Sec. 3.—The board of directors elected for the ensuing year shall be constituted as a committee to place in nomination at the annual convention, at least one member for each office and director at large. Any five members of the association may make additional nomination by filing a report, in writing, with the executive secretary in advance of the election."

Art. VIII., Sec. 1, provides that "a Manufacturers' and Technical Division of the association may be established to be composed of the associate members. This division shall elect its own officers and, subject to this constitution and by-laws, may establish such rules of procedure as it considers necessary or desirable for the transaction of its business."

An associate member is defined in Art. II., Sec. 2, as "any person, firm, or corporation engaged in the manufacture or sale of equipment or machinery used by the sand-and-gravel industry, or in the publication of trade, technical or other journals of interest to the sand-and-gravel industry, or members of technical and professional societies and organizations interested in the sand-and-gravel industry."

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## Fire Burns Independence Offices of Cement Firm

Fire caused about $1,000 damage recently at the plant offices of the Universal Atlas Cement Co. at Independence, Kan. Faulty wiring was believed to be the cause of the blaze which was extinguished by the local fire department.

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★ Three 16-ft. Sturtevant air-separators were placed in service recently at the Martin's Creek, Pa., plant of the Alpha Portland Cement Co. The equipment operates in closed circuit with three 7-ft. by 26-ft. tube-mills.

## Railroads' Plea for High Rates Rejected

### AVALANCHE OF PROTESTS FILED

On Nov. 19, the Interstate Commerce Commission rejected the petition of the railroads asking for rates which would make permanent most of the emergency surcharges which under a former decision would expire Dec. 31 of this year.

In rejecting the petition the Commission has opened for further hearing and further consideration the case in which the emergency surcharges were granted. This leaves the way open for an increase in frieght rates if the Commission finds that the condition of the carriers warrants a continuation of the emergency surcharges.

The action of the Commission in rejecting the carriers' petition was undoubtedly due to the large number of protests that were filed by shippers, individually and through associations. Prominent in this list are members of the non-metallic mineral industry, including the National Crushed Stone Assn., National Sand & Gravel Assn., National Slag Assn., Arkansas Portland Cement Co., Colorado Portland Cement Co., Nebraska Cement Co., Oklahoma Portland Cement Co., Three Forks Portland Cement Co., Union Portland Cement Co., Ashgrove Lime & Portland Cement Co., the Gypsum Assn., U. S. Gypsum Co., National Gypsum Co., Peerless White Lime Co., Aetna Portland Cement Co., Dixie Lime Products Co., Keystone Lime Rock, Inc., Southern Cement Co., Florida Lime Rock Sales Corp., Florida Gravel Co., Batesville White Lime Co., Mississippi Lime Co., Finishing Lime Assn. of Ohio, National Mortar & Supply Co., and Ohio Hydrate & Supply Co.

Unless a further order is issued continuing the present emergency charges they will expire on Dec. 31, as it is unlikely that a decision will be rendered by the Commission in this reopened proceeding before March 1, 1937.

The complete text of the protest filed by the Aggregates Association appears on another page in this issue.

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The Kansas City, Mo., offices of the Missouri Portland Cement Co., formerly located in the Federal Reserve Bank Bldg., have been moved to Room 1102, Bryant Bldg.

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★ Installation of a 120-ft. rotary kiln has been completed at the lime plant of the United States Lime Products Co. at Sonora, Cal. Crushing equipment is also being installed.

## 32 Become Members of N. S. & G. Assn.

**SERVICE FEATURE ATTRACTS FIRMS**

During the first ten months of this year, 32 new members joined the National Sand & Gravel Assn., according to V. P. Ahearn, executive secretary. In almost every instance the new memberships were the result of efforts of present members who induced the companies to join the association because of the worthwhile service it is doing for the industry as a whole. A list of the new members follows:

Arkansas River Sand Co., Tulsa, Okla.
Blue Diamond Corp., Ltd., Los Angeles, Cal.
Belton Sand & Gravel Co., Belton, Tex.
W. R. Bonsal Co., Hamlet, N. C.
Central Iowa Sand & Gravel Co., Des Moines, Ia.
Concrete Materials Co., Waterloo, Ia.
Consolidated Construction Co., Tulsa, Okla.
Consolidated Rock Products Co., Los Angeles, Cal.
Cooley Gravel Co., Chillicothe, Mo.
Eaton Canyon Rock & Sand Co., E. Pasadena, Cal.
Edmondson-Tamborelle Co., Houston, Tex.
Graham Bros., Inc., Los Angeles, Cal.
Granite Materials Co., N. Hollywood, Cal.
H. & H. Rock Co., Sweetwater, Tex.
B. V. Hedrick Gravel & Sand Co., Lilesville, N. C.
Hodgson Sand & Gravel Co., Netcong, N. J.
R. E. Janes Gravel Co., Austin, Tex.
Lyman-Richey Sand & Gravel Co., Omaha, Neb.
Marquette Cement Mfg. Co., Memphis, Tenn.
Merom Gravel Co., Indianapolis, Ind.
Myers Gravel & Sand Co., Anderson, Ind.
North Texas Materials Co., Dallas, Tex.
Osage Sand & Contracting Co., Osage, Okla.
Piru Rock Co., Ltd., Los Angeles, Cal.
Price Sand Co., Tulsa, Okla.
Producers Sand Co., Tulsa, Okla.
The Producers Gravel & Sand Co., Shreveport, La.
Rock, Sand & Gravel Producers Assn. of Northern California, San Francisco, Cal.
Smith Sand Co., Tulsa, Okla.
Standard Paving Co., Tulsa, Okla.
Tulsa Sand Co., Tulsa, Okla.
Western Sand & Gravel Co., Lincoln, Ill.

## Highway-Fund Diversion 60 Per Cent. Last Year

Of the $99,740,000 which the state of New York collected last year from motorists in gasoline taxes, registration fees and drivers' licenses, supposedly for highway maintenance and construction, a total of $58,526,853 was diverted for nonhighway purposes, it is revealed in a report by the United States Bureau of Public Roads.

An analysis of the Bureau's report made public by the American Petroleum Industries committee, shows that no other state approached the percentage of highway-tax diversion in New York, although in several the percentage was startlingly high. In South Dakota, 42.3 c. of every highway tax dollar went for nonhighway purposes; in Massachusetts, 40.3 c.; in Georgia and Florida, more than 30 c.; Delaware, North Dakota, Oklahoma and the District of Columbia, more than 20 c.

In discussing the Bureau report, the committee states that taxpaying motorists throughout the country were "shortchanged" about 16 c. out of every dollar.

"More than 150,000 highway workers were kept out of employment; nearly half a billion dollars in trade and wages failed to materialize, and highway work substantially was curtailed by the use for the general purposes of $146,499,711 in highway funds," the report said.

## Knode Replaces Avery as President of U. S. Gypsum

O. M. Knode, formerly executive vice-president, has been made president of the United States Gypsum Co., succeeding Sewell L. Avery, who becomes chairman of the board in order to be able to devote more of his time to the affairs of Montgomery Ward & Co., of which he is chairman of the board and president.

## Detroit Firm Acquires Flint Sand-Brick Plant

Block & Brick, Inc., of Detroit, has acquired the Flint Sand Brick Co. of Flint, Mich., it was announced by F. Langdon Hubbard, president of the Detroit concern. Taking over of the Flint plant will increase the firm's potential productive capacity by about 50 per cent. and will add to facilities for meeting demands in and around the active Flint area. Plans call for the continuation of the Flint plant as a separate company under its own corporate name.

## Expounds Advantages of Rock Asphalt Over Radio

A series of Sunday-evening radio addresses over station WHAS at Louisville, Ky., has been completed by A. H. Hinkle, director of the Kentucky Rock Asphalt Institute. Subjects of the talks were "Highway Accidents," "The Engineer's Part in Road Building," "Why Some Roads Become Wavy," and "Resurfacing Old Roads."

## Installs Four New Shaft Kilns at Luckey, O., Plant

★ Four large-type shaft kilns designed by Arnold & Weigel are being installed at the Luckey, O., finishing-lime plant of the National Gypsum Co. The new kilns will be ready to go into operation early in the spring of next year.

## Bar Railroads from Truck Competition

**I. C. C. ISSUES ITS ULTIMATUM**

Indicating a major policy to govern administration of the Motor Carrier Act, the Interstate Commerce Commission has issued a report which bars railroads from engaging competitively in trucking operations. Using strong phrases, the commission takes note of monopolistic possibilities and sets forth definite rules to protect the public interest. The report presents for the first time basic interpretations of policy under the Motor Carrier Act concerning railroad acquisitions of motor-carrier units.

"We are not convinced," the commission declares in the report, "that the way to provide for the future healthful competition between railway and truck service is to give the railroads free opportunity to go into the kind of truck service which is strictly competitive with, rather than auxiliary to, their railway operations. The language of Sec. 213 [of the Motor Carrier Act] is evidence that Congress was not convinced that this should be done."

The commission refused to sanction the acquisition by a railroad of a motor carrier through a holding company over which the commission does not have jurisdiction. By its report the commission specifically refused to authorize the purchase of the Barker Motor Freight Lines, which operate in six states, by a Pennsylvania Railroad subsidiary, except under definite limitations designed to protect existing competition.

"Truck service," the commission further stated, "would not, in our judgment, have developed to the extraordinary extent that it has, if it had been under railroad control. Improvement in the particular service now furnished by the partnership might flow from control by the railroad, but the question involved is broader than that and concerns the future of truck service generally.

"The financial and soliciting resources of the railroads could easily be so used in this field that the development of independent service would be greatly hampered and restricted and with ultimate disadvantage to the public."

★ A Williams kiln mill for pulverizing fullers' earth to 90 per cent. passing a 200-mesh screen was recently installed at the plant of the Flatonia Fullers Earth Co., Flatonia, Tex. The equipment has a capacity of two tons hourly. The company's output is absorbed by the lubricating-oil and cottonseed-oil refining trade.

## Residential Building Records Sharp Gains

**RISES 45 PER CENT. IN OCTOBER**

Residential building started in October was 45 per cent. greater in volume than the recorded figure for October, 1935. According to F. W. Dodge Corp., the October residential building total was $79,736,200 for the 37 eastern states as compared with $55,100,300 for October of last year and $80,670,800 for September of this year. For the ten months of 1936 ended Oct. 31, residential building amounted to $667,767,800 as against only $394,007,800 for the corresponding ten months of last year, making a gain of 70 per cent. between the two years.

The volume of non-residential building started in October in the 37 eastern states amounted to $79,071,300 as compared with only $59,180,400 for this class of work in October, 1935, and $69,098,700 for September of this year. Non-residential building operations in the initial ten months of 1936 in the area east of the Rocky Mountains amounted to $814,408,400 for a gain of 70 per cent. over the total of only $482,-902,300 shown for the comparable period of 1935.

Heavy engineering, i.e., public works and public utilities, accounted for an additional construction volume in October of $67,032,400. Chiefly because of declines in public construction, heavy engineering jobs in October fell below their respective totals for either the previous month or October, 1935.

For all classes of construction, the October, 1936, figure for the 37 eastern states totaled $225,839,900 and compares with $200,595,700 for October, 1935, and $234,271,500 for September of this year. The total volume of construction of all types undertaken in the area east of the Rocky Mountains during the ten month period ended October 31 amounted to $2,267,468,100 and represents an increase of 63 per cent. over the comparable figure of $1,392,-293,400 for the corresponding ten months of 1935.

## Beeman Resigns P. C. A. Post at Washington, D. C.

For a number of years manager of the Portland Cement Assn.'s strategic Washington, D. C., office, Mark Beeman has resigned because of ill health. Mr. Beeman plans to spent the winter in Florida and his future activities will be dependent upon the degree of his recovery.

Succeeding him at Washington will be M. J. McMillan, according to an announcement by Wm. E. Kinney, general manager of the association. Mr. McMillan has been assistant manager at the capital office since April 15, 1933, and served as acting manager while Mr. Beeman was away on a leave of absence during the summer of 1935.

## Erecting Aerial Tramway to Pennsylvania Plant

★ The Stowe-Fuller Refractories Co. of Alexandria, Pa., has awarded a contract to the Interstate Equipment Corp., New York, N. Y., for a fully automatic aërial tramway to convey materials from the company's mountain mine to its plant at Alfarata, Pa.

The tramway will be 4,600 ft. long and have a capacity of 300 tons daily. The installation will go into operation in December.

## Yosemite Stockholders Approve Reorganization

By a vote of 75 per cent. of Class A stockholders of the Yosemite Portland Cement Co. a reorganization plan for the concern was approved last month.

The plan provides for a reduction of the capitalization of the concern from $3,622,510 to $2,771,810 through the replacement of Class A stock for a new issue which bears a non-cumulative 5-per cent. dividend. The new stock also will participate in a 70-per cent. share of additional dividends, according to Walter Couse, secretary-treasurer of the corporation.

Under the plan, also, the value of Class B stock will be reduced from $10 to $1, Mr. Couse said.

## 6 Cement-Storage Silos Are Under Construction

★ Contract for the construction of twelve reinforced-concrete storage silos at the Independence, Kan., plant of the Universal Atlas Cement Co. has been awarded to the Burrell Engineering & Construction Co., Chicago, Ill., and the work is now underway.

The silos are 26 ft. by 80 ft. in size with six interstice bins and a full concrete basement under the entire storage. The job is expected to be finished about the middle of December.

## Lone Star's Earnings Soar in Nine Months

**EQUIVALENT TO $2.60 PER SHARE**

The Lone Star Cement Corp., until recently the International Cement Corp., and subsidiaries for the quarter ended September 30, 1936, had a net profit of $836,049 after depreciation, interest, reserve for federal income taxes and contingencies, etc., equal to $1.06 a share on 789,755 shares. No provision is made for federal surtax on undistributed profits.

This compares with $746,981 or $1.10 a share on 678,791 shares in the preceding quarter and $299,707 or 48 c. a share on 626,278 shares in the September quarter of 1935.

For the nine months ended September 30, net profit was $2,051,335, equal to $2.60 a share on 789,755 shares, against $754,728 or $1.20 a share on 626,278 shares in the first nine months of 1935.

The increase of 163,477 shares outstanding represents issuance due to the conversion of $5,726,000 of 10-yr. 4 per cent. convertible debentures converted during the first nine months of 1936, leaving outstanding at September 30, last, $6,274,000 principal amount of debentures. Since that date, additional conversions have been made, so that at October 20, 1936, the total conversion aggregated $6,638,000 of debentures, leaving then outstanding $5,362,000 principal amount.

## Oklahoma and Arkansas May Build Cement Plant

The state-owned cement plant bug has bitten again, this time in the open spaces of the great southwest.

Oklahoma is reported to be toying with the idea and the latest proposal is that the state join with Arkansas in erecting a plant to supply the needs of both states. Proponents believe they can produce the material for about 10 c. a bag!

Marketed under the trade-name "Medco," the Medusa Portland Cement Co., Cleveland, O., is now producing a new rapid-hardening Portland cement.

**VALUE OF MATERIAL ORDERS ON P.W.A. CONSTRUCTION PROJECTS, JULY, 1933 TO JULY, 1936.**

| | |
|---|---|
| Cement | $153,514,425 |
| Concrete products | 31,687,668 |
| Crushed stone | 45,138,008 |
| Lime | 320,801 |
| Marble, granite, slate, and other stone products | 22,988,801 |
| Minerals and earths, ground or otherwise treated | 126,895 |
| Sand and gravel | 79,327,092 |
| Tiling, floor and wall, and terrazzo | 3,800,671 |
| Wall plaster, wall board, insulating board and floor composition | 5,650,067 |
| Total | $342,555,428 |

## Concrete Conference Planned for Chicago

**IMPORTANT GATHERING JAN. 18-20**

The largest meeting of concrete-products manufacturers and concrete contractors that has yet taken place is expected in Chicago on Jan. 18, 19 and 20, 1937.

The biggest event of the week will be the first National Concrete Contractors' Conference where a clinic will be held on new ideas in modern construction and sales methods.

Advances in methods of construction and the rapidly increasing building market have made it imperative that contractors keep in step with these developments if they are to meet competition and continue to operate at a profit.

According to reports, the program will cover every phase of contractors' problems. Leading contractors and engineers will reveal the details of modern concrete-construction practices. Specialists will analyze the growing market and leaders in the field of advertising and promotion will show where and how contractors can increase their share of the business.

A highlight of the program on the subject of the concrete house will be the complete construction and cost story of the Purdue University's research house told by Robert E. Schwartz of the Chas. Gamsky Construction Co.

Another feature will be movies showing how concrete can be pumped easily and quickly to all parts of a small job. Similarly, innovations in every phase of the contracting business will be aired. New types of forming, how to use color, and how to finish concrete floors are typical of the other subjects to be presented.

In addition to the National Concrete Contractors' Conference, at the Sherman Hotel, four other groups of concrete users will hold their conventions simultaneously. The National Concrete Masonry Assn., the Cast Stone Institute, The American Concrete Pipe Assn., and the National Cinder Concrete Products Assn. have planned their meetings at the same time. Several joint sessions have been scheduled to make it possible for the related industries to promote harmony and cooperation in the interest of progress in the construction field.

Climaxing the conventions, will be a large exhibit of concrete machinery, accessories and materials. This is being sponsored by the Concrete Industries' Exposition.

Members of the Exhibitors' Advisory Board of the Concrete Industries Exposition, which is sponsoring the show, include prominent men from every branch of the cement industry. They are:

Eugene F. Olsen, Stearns Mfg. Co. *(Chairman);* Jesse H. Besser, Besser Mfg. Co.; Louis Brookman, Jr., *Concrete;* J. H. Chubb, Pennsylvania-Dixie Cement Corp.; D. S. Colburn, Marquette Cement Mfg. Co.; B. F. Devine, Chain Belt Co.; Lion Gardiner, Jaeger Machine Co.; Robert Harris, Blaw-Knox Co.; A. E. Hjerpe, Consolidated Cement Corp.; D. S. MacBride, International Cement Corp.; D. H. MacFarland, Medusa Portland Cement Co.; Roy N. McCandless, Cinder Block, Inc.; Frank Muenzer, Multiplex Concrete Mach. Co.; Thomas W. Noble, Thos. W. Noble Co.; H. H. Potts, Pottsco Corp.; B. H. Rader, Lehigh Portland Cement Co.; T. A. Rehnquist, T. A. Rehnquist Conc. Floor Co.; Dan F. Servey, Haydite Corp.; J. L. Shiely, J. L. Shiely Co.; Blaine S. Smith, Universal Atlas Cement Co.; H. F. Thomson, General Material Co.; Stanton Walker, National Ready Mixed Concrete Assn.; and Benjamin Wilk, Standard Building Products Co.

## Col. Chevalier to Head Road Builders Once More

Col. Willard T. Chevalier, who is well known to the nonmetallic-minerals industry, having been one of the speakers at the annual conventions on several occasions, will be the next president of the American Road Builders' Assn. Col. Chevalier, who is vice-president of the McGraw-Hill Publishing Co., was named as the only nominee by the A.R.B.A. nominating committee and he will be officially elected at the annual convention at New Orleans, La., next January.

Nominees for vice-presidents are: Paul B. Reinhold, Reinhold & Co., Inc., Pittsburgh, Pa.; Lion Gardiner, vice-president, Jaeger Machine Co., Columbus, O.; Alex Hancock, Hancock Construction Co., Mobile, Ala.; and Stanley Abel, highway supervisor, Kern County, Taft, Cal.

## Universal Atlas Attains New Safety Achievement

New records for industrial safety not previously attained by that company were established in the period ended Nov. 1, by the Universal Atlas Cement Co., according to Gordon C. Huth, manager, bureau of safety and casualty.

On October 31, its Waco, Tex., plant had operated 553 days without a disabling injury, a record not before achieved by that plant. On October 26, its Universal (Pittsburgh) Pa., plant set a new record for the entire company having operated 2,000 days, or more than 2,000,000 man hours, without a disabling injury. On October 30, its Hudson, N. Y., plant duplicated a former performance when it completed 12 consecutive months without a disabling injury.

## Chairmen of Safety Committees Chosen

**FOSTER, HUNT HEAD SECTIONS**

Officers and committee chairmen of the Cement and Quarry sections of the National Safety Council for the coming year were elected at the close of the National Safety Congress held recently at New York, N. Y. The personnel has been announced as follows:

QUARRY SECTION

General Chairman—Alex. Foster, Jr., Warner Co., Philadelphia, Pa.

Vice-Chairman—Russell Rarey, Marble Cliff Quarries Co., Columbus, O.

Secretary and News-Letter Editor—N. B. Sipe, J. E. Baker Co., York, Pa.

Poster-Committee Chairman—H. F. Yotter, General Crushed Stone Co., Easton, Pa.

Publicity-Committee Chairman—J. R. Boyd, National Crushed Stone Assn., Washington, D. C.

Statistics-Committee Chairman—W. W. Adams, U. S. Bureau of Mines, Washington, D. C.

Members at Large—V. P. Ahearn, National Sand and Gravel Assn., Washington, D. C.; William H. Baker, J. E. Baker Co., York, Pa.; O. M. Graves, General Crushed Stone Co., Eaton, Pa.; S. Walter Stauffer, National Lime Assn., Washington, D. C.; A. L. Worthen, Connecticut Quarries Co., Inc., New Haven, Conn.

CEMENT SECTION

General Chairman—Fred B. Hunt, Nazareth Portland Cement Co., Nazareth, Pa.

Vice-Chairman—W. J. Worthy, Medusa Portland Cement Co., Toledo, O.

Secretary—A. J. R. Curtis, Portland Cement Assn., Chicago, Ill.

News-Letter Editor—Jack Dempster, Canada Cement Co., Ltd., Port Colburne, Ont., Canada.

Engineering-Committee Chairman—William Moeller, Lone Star Cement Co., Dallas, Tex.

Highway-Committee Chairman—M. A. Koffman, Southwestern Portland Cement Co., Los Angeles, Cal.

Membership-Committee Chairman—H. A. Reninger, Lehigh Portland Cement Co., Allentown, Pa.

Poster-Committee Chairman—J. W. Kennedy, Huron Portland Cement Co., Detroit, Mich.

Program-Committee Chairman—A. B. Sutherland, Ash Grove Lime & Portland Cement Co., Kansas City, Mo.

Members at Large—D. B. Coleman, Missouri Portland Cement Co., St. Louis, Mo.; R. B. Fortuin, Pennsylvania-Dixie Cement Corp., Nazareth, Pa.; Gordon C. Huth, Universal Atlas Cement Co., Chicago, Ill.; E. Posselt, Lone Star Cement Corp., New York, N. Y.; J. B. Zook, Great Lakes Portland Cement Corp., Buffalo, N. Y.

## Monolith Plans to Build 20 Houses of Concrete

Following the removal of its executive offices from Los Angeles to the plant at Monolith, Cal., the Monolith Portland Cement Co. is considering plans for the erection of 20 monolithic-concrete houses as homes for its executive personnel and office force.

# Editorials

## Steering a Middle Course

EVERY mariner knows the advantages of piloting his boat safely between the hidden as well as the visible dangers that lie to the right and the left. Experience has taught him the wisdom of steering a middle course. He foregoes something of his desire to explore the open sea; he checks his tendency to hug the shore too closely. He might gratify the desire and let the tendency have its way, but he has learned that it is prudent to concede something to reality, that he must curb his longing for everything if he would retain his control of something. Unfortunately, few of us are good mariners; few of us travel the middle course.

In common with other peoples of the world we are trying to pilot a ship of state. On either side of us lie the hazards that beset all navigators, the extremes of opinion and practice that represent the conflict between rival schools of thought. Collectivism and individualism, private enterprise and state socialism, anarchism and the totalitarian state, complete individual liberty and centralized dictatorial authority, the lone wolf and the pack. None of these are totally good, none totally bad; in a wise proportioning of their good qualities will be found the mixture best suited to any period of time. The advances of civilization represent the degree of success attained in searching for the blend that is best attuned to the temper and condition of the times. The discovery is always a blend; the course always lies somewhere between the extremes.

It should be the aim of all members of society, as it has by common consent been considered to be the objective of all statesmen worthy of the name, to find that in-between course, to weigh the alleged advantages of alternative political, economic and social theories, to try to understand the trends whose evidences are as clearly marked as are those of the evolutionary trends of geologic history, to separate the traditional from the valuable, to adopt that attitude of mind which is ready to discard when necessary the "what has been" in favor of the "what should be." And business men in particular, since they wield such a great influence on our daily lives, should not neglect this duty which they owe to the society in which they live and make their living; they should not ignore a responsibility which they owe to themselves and to the properties they operate. They cannot, without grave danger to their material interests, continue to remain cloistered against the unceasing advance of thought, however unusual it may be; they can not continue doggedly to deny the reality of changing times, changing ideas and changing standards; they can not with reason insist upon a preservation of the *status quo* in a world that has no place for stagnation. They dare not fail to move forward in a universe that tolerates fixity no more than a vacuum.

A middle course in the field of economics, a means of reconciling the conflicting interests of individualism and collectivism, of capitalism and socialism, has been found by Sweden, according to Marquis W. Childs. In that country the government has made a success of managing public utilities, such as the telephone and telegraph facilities, the railroads, and the power and forest resources belonging to the Swedes, while consumer-owned organizations have taken over almost a third of the nation's retail trade. Sweden's experience, as unfolded in his recent book, *Sweden, the Middle Way,* indicates that an honest government, aware of its limitations as well as its opportunities, can give its citizens an efficient administration of such properties.

In Sweden these social experiments are not the proposals of any one party, nor are they expressions of any one philosophy, certainly not of any of the philosophies of collectivism, communism, or socialism. They have been made as sincere attempts to correct abuses and to provide better ways of performing functions in whose efficiency and integrity the whole nation has an interest. "The greatest good for the greatest number" is probably a reasonably good definition of their common objective. The Swedes have not abandoned their belief in the fundamental soundness of individual property rights; they have not lost their belief in the value of individual initiative. They have merely decided that there are some social functions that can be better performed by groups actuated by a desire to serve the people, and that there are some forms of property, such as natural resources, that belong to the people as a whole and must be conserved in their interest. In hundreds of years of experience with various forms of economic life they have until now found no satisfactory solution of their economic problems, and in their new practice they have apparently not found it necessary to destroy the capitalistic system. Sweden is steering a middle course.

The hue and cry of the absolutists, whether rightists or leftists, continues unabated, while in some parts of the world sincere and sober thinkers go quietly about their work, studying changing social needs, giving serious thought to the ways in which those needs may be met with the least disruption of existing economic organization and with the least offense to long-settled prejudices. And when what appear to be sound proposals are offered, there is not lacking the courage necessary to make them effective nor the popular support required to make them successful. Business men, who might be thought to be

most naturally opposed to innovations because they have seemingly the most to lose by their introduction, give at least outward—even if not always inward—approval, believing rightly that discretion, that is concession, is the better part of valor.

Many of the economic problems with which European countries have been faced and which have in some cases, as in that of Sweden, been solved at least for a time by concessive measures are now, or soon will be, before the American people. In the modern world economic isolation, whether in activity or thought, is a myth, and no boundaries, political or economic, can render one nation immune to the difficulties that affect other nations. Economic barriers may stop trade, but nothing can check the flow of thought. Government ownership of public services, government regulation of industry, collective bargaining, social security, consumer coöperatives, and the dozens of other economic concepts which have only recently become more than terms in the lives of most American business men have no nationality and therefore have no political limitations in their applicability to similar conditions. We must be prepared to see similar remedies offered for similar ills and to accept the use of the most modern technique rather than to insist upon the employment of outworn practices. Not until we are so prepared will new ideas cease to terrify us.

## Competition Aids Progress

THERE is something to be said for the theory of the father who, when chided for beating his boy, replied that he had found it impossible to reason with him and was only trying to "knock some sense into his head." Many of us learn more rapidly through bitter experience than through the teachings or examples of those who are gifted with a keener appreciation of logical analysis. Perhaps we respond too readily to emotional appeals, such as that inspired by fear, and too tardily to those based on reasoned conviction.

More than twenty years ago, when the dependability of public motor transportation of freight and passengers had already been demonstrated abroad and was beginning to catch the attention of municipal and interurban steam- and electric-railway officials in this country, many earnest men labored untiringly but without noticeable success in an effort to convince railroad operators that the new mode of transport was a permanent form of competition and that the best way of meeting it was to absorb it. Bred—and one might almost say born—in the sphere of railroading, they could not visualize any dependable form of mass transportation that was not founded on fixed tracks. They looked upon the motor vehicle as a very convenient modern utility—always ready for personal use, serviceable in delivering household necessities, and even economical, perhaps, in city freight hauling—but utterly unsuited to interurban transport. Not until the business of public motor carriers cut into their revenues—not, indeed, until the motor vehicle in competitive hands threatened in some cases the very continuance of railroading—did certain railroad officials see the necessity of entering themselves the business of professional motor haulage. Today they operate not only intercity motor buses and trucks but perform local services in transporting passengers and freight between terminals and in store-door delivery.

Motor competition has had the effect of lowering freight rates and preventing increases in railroad tariffs. One of the most potent arguments offered by shippers in our industries in protest against proposed increases in Ex Parte 118 before the Interstate Commerce Commission was the threat of a continued diminution in revenue freight from these industries and a continued diversion of that traffic to motor trucks. The combined presentation of the National Crushed Stone Association, the National Sand & Gravel Association and the National Slag Association emphasized this danger to railroad stability in its plea against the railroads' petition for higher rates. The commission's refusal to grant permission for tariff increases illustrates the effectiveness of the threat of competition.

Senator Burton K. Wheeler of Montana, in a recent radio address, implied even more, when he said: "Buses and trucks are wonderful things; they have accomplished what Congress, the Interstate Commerce Commission and the shipping public have never yet been able to accomplish—they are to-day stirring the sleepy giant, the railroad monopoly, into almost unheard-of activity. And perhaps it will be this activity that will save him."

As we have said before, there is an interesting parallel between the experience of the railroads and the situation among aggregates producers. Many of the latter have felt the growing strength of portable-plant competition in recent years, a form of competition that has taken traffic away from the railways at the same time that it has taken business from aggregates-plant operators. Efforts to check this new form of competition through repressive measures have been no more effective than were similar measures designed to strangle motor transport. For certain types of work both motor vehicles and portable aggregates plants possess demonstrable advantages which materially affect the competitive situation between those who utilize them and those who do not. To attempt to belittle those advantages, or, what is sillier, to attempt to deny their existence—as the railroads denied the reality of the superiority of motor transport—is to be guilty not alone of self-deception but of self-destruction. Astute politicians say: "If you can not beat them, join them." Many aggregates producers have discovered the wisdom of broadening their activities and altering their basic conception of what constitutes their proper function and have met the competitive threat of portable plants by buying portable plants, which enable them to meet the new type of rivalry on its own field and with its own weapons. Unable to beat them, they have joined them; and in the new situation have the advantage of greater resources and longer experience.

Above: Scrubber building viewed from top of screening building. Main conveyor to plant is in left foreground.

Below: View of pit with fan conveyor in foreground. Note berms left so pit can later be used as waste pond.

By W. E. TRAUFFER

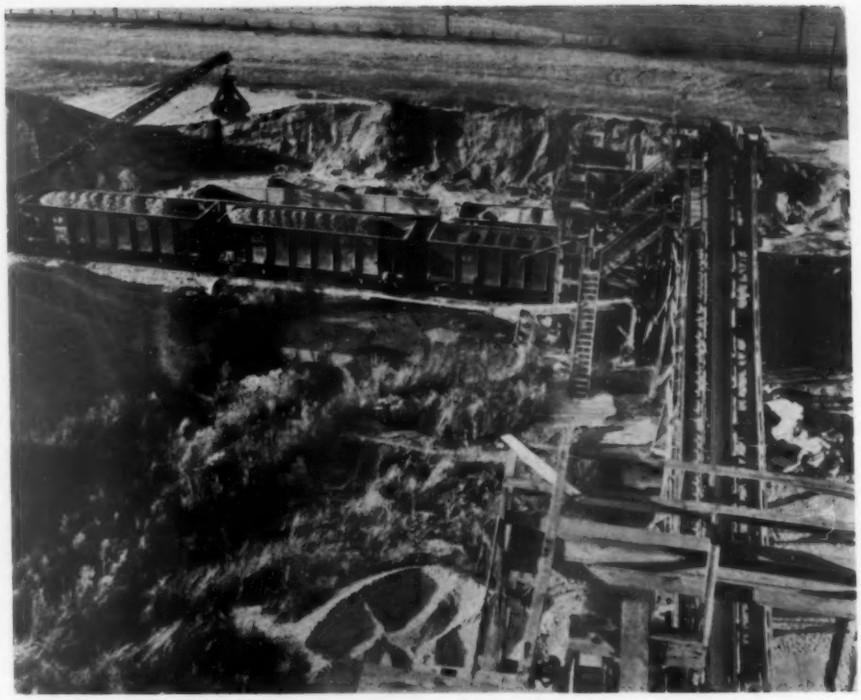
# Long Belt-Conveyors Transport Material to California Plant

ONE of the most progressive independent aggregate-producing companies on the Pacific Coast is the California Rock & Gravel Co., whose main office is located at 500 Call Bldg., San Francisco, Cal. This company on March 1, 1933, put into operation a modern new sand-and-gravel plant of 200-ton per hr. capacity at Eliot, Cal. Conspicuous features of this plant are its exceptional facilities for washing all its products and its design to allow enlargement at a nominal cost at any time. The latter feature was taken advantage of recently when a crushed-rock unit was added to the plant.

The plant location at Eliot, Alameda County, Cal., is about 3 mi. west of Livermore and 40 mi. southeast of Oakland. A number of other large plants are in the vicinity, which supplies most of the aggregates for the San Francisco Bay district. Its location on a main highway and on the Southern Pacific Ry. makes possible shipments in all directions.

The property of about 165 acres is all gravel-bearing and is typical of the river deposits in this valley. Good material is known to exist to a depth of 100 ft., but the pit is at present 55 ft. deep. The overburden averages 1 ft. in depth and is not removed. The material in the deposit has a sand content of about 35 per cent. and is so well graded that only about 12 per cent., mostly pea gravel, is wasted in processing.

In the pit a Bucyrus 50 B 1¾-cu.yd. electric shovel places the excavated material in an 8-cu.yd. steel field hopper mounted over a 24-in. swinging or fan conveyor on which it is discharged by means of an 18-in. reciprocating feeder. No grizzly is used over this hopper as there are very few bowlders in the deposit. This swinging conveyor discharges the material on a 24-in. field conveyor which carries it to a 24-in. conveyor that is set at right angles to it and carries the material up out of the pit. The fan conveyor is in 50-ft. sections and is swung in and about the end of the field conveyor. As each swing is completed another 50-ft. section is added until it is 200 ft. long. As the shovel cut is 50 ft., a 250-ft. cut is made. The field conveyor is now 725 ft. long.



The loading building where material receives final washing before being loaded into cars for shipment.

The main conveyor from the pit is permanently mounted on timber framework and is 400 ft. long. It discharges the material into a 2-cu.yd. hopper feeding a 6-ft. by 20-ft. Link-Belt revolving chain-drive scrubber fitted with spiral flights. Water is added to the material at the scrubber at the rate of about 500 gal. per min. On the discharge end of the scrubber is a 7-ft. long conical scalping section with 1⅜- and 3-in. perforations.

The minus 1¼-in. material from this scalping screen goes to a Hadsel reciprocating washer for additional cleansing and is discharged on the main plant conveyor. The dirty water overflows into a sand-drag. The oversize (plus 3-in.) material is discharged into a 13-in. Allis-Chalmers McCully gyratory crusher which reduces it to 1½ in. and under. Both the crusher product and the 1¼- to 3-in. material from the screen are also discharged on this conveyor.

The 24-in. main plant conveyor is 300 ft. long and is inclined to the top of the final preparation plant, where all the

General view of plant with loading building at extreme left, screening building in center and scrubber building at right.

material is discharged on the new 4-ft. by 14-ft. Allis-Chalmers triple-deck Low Head screen. Water is again added here at the rate of about 700 gal. per min. This screen is fitted with 1⅛-, ⅞-, and ⅜-in. wire cloth. The material retained on the middle deck is chuted to a bin as ⅞-in. gravel. The material from the bottom deck goes to a bin as ⅜-in. ma-

The 1¾-cu. yd. electric shovel which loads hopper on fan conveyor.

terial and is mixed as needed with the ⅞-in. The material retained on the top deck is chuted to a 4-ft. by 8-ft. Allis-Chalmers double-deck screen which is fitted with 2½-in. and 1⅜-in. wire cloth. The material retained on the bottom deck of this screen is 2½-in. gravel and that passing the bottom deck is 1½-in. gravel. Both sizes are discharged by gravity into bins. The gravel retained on the top deck of this second screen drops into a bunker from which it is fed to a No. 7 Allis-Chalmers Newhouse crusher. The crushed gravel is discharged on a 24-in. by 200-ft. inclined belt-conveyor which carries it to the crushed-rock unit for segregation. The oversize material is discharged on the main conveyor running to the first screen. The tunnel loading conveyor under the storage bins can also be reversed to discharge its load on the 24-in. conveyor feeding the crushed-rock unit. Thus material from storage may be fed through a track hopper to the loading belt and crushed or rerun by by-passing at the crushed-rock unit.

The large drag tank which recovers valuable fines from waste water.

The material passing through the bottom deck of the first screen (⅜-in. minus) with the wash water is discharged on a third Allis-Chalmers screen, a 4-ft. by 8-ft. double-deck unit. This has ⅜-in. wire cloth on the top deck and 4½-mesh and 3/16-in. cloth on the bottom deck. The material retained on the top deck is ⅜-in. gravel and that retained on the bottom deck is pea gravel. Both are discharged into bins.

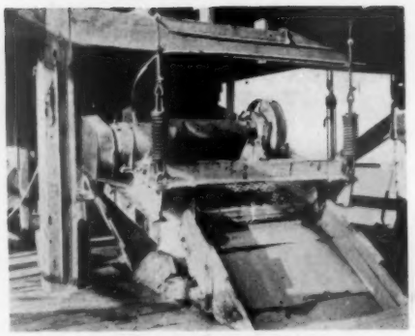
The material passing the bottom deck of the third screen is sand and is split to two 30-ft. Link-Belt drag tanks. The feed to these drags is regulated so that about 60 per cent. of the material goes to the drag producing concrete sand. The other drag produces a special fine concrete sand. Both sands are discharged into individual bins.

The overflow from these sand drags, with that from the preceding washer and scrubber, is flumed to a 4-ft. by 33-ft. Link-Belt drag having an extra-

The primary gyratory crusher which reduces oversize gravel.

large tank. This was installed in April, 1935 to recover valuable fines (minus 50-mesh), which were being lost in the waste water. Tests had determined that the waste water, amounting to between 1,200 and 1,400 gal. per min., was carrying about 10 tons of fine solids per hr., of which about 70 per cent. (from 80- to 200-mesh), was valuable if it could be saved.

The drag tank is 14 ft. wide, 8 ft. deep and 30 ft. long and has a capacity of 6,000 gal. It is of welded-steel construction and is provided with baffles to prevent "boil" from the incoming water and has a weir on the discharge end which reduces the water velocity to less than 1½ ft. per min. A device designed by Supt. Silva wipes the drag blades at the discharge end of the tank. This machine is actually recovering from 6 to 7 tons per hr. of this fine sand which enables the company to meet any sand specifications. A 16-in. by 150-ft. belt-conveyor discharges this



One of the three vibrating screens used in this plant.

sand into the bin which receives the product of the fine-sand drag previously described.

The waste water from the large fine-sand drag, which is located on ground-level, is piped by gravity to a waste pond formed by an abandoned pit. A berm of waste pea gravel built across the pit filters the water into the other end of the pit for re-use. It is expected that the silt in the waste water will eventually prevent the flow of water through this berm so the present pit is being excavated with narrow closures so that in the future a berm can readily be built across it.

The plant storage bin is of the latticed-timber construction commonly used in California and rests at ground-level on concrete foundations. This bin has eight compartments and a total capacity of 1,450 tons. There are no provisions for loading out material direct from these bins at the side. Under each

View of loading building showing revolving scrubber and swinging chute.

compartment is a sliding gate discharging on a 30-in. by 200-ft. tunnel belt-conveyor. These gates are marked so that separate gravel sizes, any blend of sand or gravel, or concrete mix can be made on this conveyor.

This belt-conveyor is inclined outside the tunnel to discharge into a 4½-ft. by 10-ft. Bodinson revolving scrubber for

TABLE OF EQUIPMENT, MOTORS AND DRIVES

| Unit | Description | Motor | Drive |
|---|---|---|---|
| Fan conveyor | 24-in. by 50- to 200-ft. | 10-hp. Westinghouse | Gearmotor |
| Cross conveyor | 24-in. by 725-ft. | 20-hp. Westinghouse | Gearmotor |
| Pit conveyor | 24-in. by 400-ft. | 25-hp. A-C | Gears |
| Revolving scrubber | Link-Belt, 6-ft. by 20-ft. | 40-hp. G. E. | Gears and chain |
| Reciprocating washer | Hadsel | 25-hp. A-C | Flat belt |
| Primary crusher | Allis-Chalmers McCully 13-in. gyratory | 50-hp. A-C | Texrope |
| Main belt conveyor | 24-in. by 300-ft. | 25-hp. A-C | Gears |
| Vibrating screen | Allis-Chalmers Low Head 4-ft. by 14-ft. | 15-hp. A-C | Texrope |
| Vibrating screens (2) | Allis-Chalmers 4-ft. by 8-ft. double deck | 7½-hp. A-C | Texrope |
| Secondary crusher | Allis-Chalmers Newhouse No. 7 gyratory | 75-hp. A-C | Direct-connected |
| Return conveyor | 24-in. by 200-ft. | 25-hp. A-C | Gear |
| Sand-drag tanks (2) | Link-Belt, 30-ft. | 7½-hp. A-C | Gears |
| Large drag tank | Link-Belt 4-ft. by 33-ft. | 2-hp. Westinghouse | Gearmotor |
| Fine-sand conveyor | 16-in. by 00-ft. | 3-hp. Westinghouse | Gearmotor |
| Tunnel belt-conveyor | 30-in. by 200-ft. | 25-hp. A-C | |
| Final revolving scrubber | Bodinson, 4½-ft. by 10-ft. | 20-hp. Westinghouse | Gearmotor |

final washing. A 5-ft. long conical screen section with 5/16-in. perforations dewaters the material discharged from the scrubber. A stationary chute is used for car loading. When sand or a concrete mix is being loaded, it is discharged from the conveyor into a swinging loading chute which distributes it into cars. In the case of the concrete mix this prevents segregation. The motion of this chute is imparted by an off-set sheave on the conveyor drive.

Fresh water for washing is obtained from a 600-ft. well by a No. 10 Kimball-Krogh pump driven by a 100-hp. U. S. motor. This water is used on the final scrubber and on the third or final sizing screen. The filtered pond water is supplied by a 5-in. Kimball-Krogh centrifugal pump driven by a 50-hp. G. E. motor. This water is sent to the preliminary washer, the first scrubber and to the preliminary sizing screen at the head of the main conveyor. All the conveyor belting used in this plant was supplied by the American Rubber Mfg. Co., Emeryville, Cal.

Material can be stock-piled and reclaimed by a 25-ton Industrial Brownhoist gasoline locomotive crane with a 1¼-cu.yd. clam-shell bucket. The railroad yard connecting with the Southern Pacific Ry. has about 9,000 ft. of standard-gage track. This trackage serves the stock-piles and also provides storage for 50 empty cars and 35 loaded cars. The tracks are graded for gravity operation of the empty and loaded cars.

F. B. Roberts, assistant superintendent and J. S. Silva, superintendent, in front of office.

The plant was designed and its construction supervised by A. D. Hadsel, C. E., a consulting mining engineer who has had a wide experience extending over many years in the construction and operation of rock and gravel plants. He also has designed equipment widely used in aggregate-producing and metal-mining operations. Mr. Hadsel formerly was operating manager of the Coast Rock & Gravel Co. which was consolidated with Pacific Coast Aggregates, Inc.

F. W. Erlin, vice-president and general manager of the California Rock & Gravel Co., formerly held the same position with the Coast Rock & Gravel Co. After the consolidation with Pacific Coast Aggregates, Inc., he was a director of that firm until the formation of the new company. F. N. Woods, Jr., is president of the company and C. A. Roller is secretary and treasurer. J. S. Silva is plant superintendent and F. B. Roberts is assistant superintendent and plant office man.

## Crushed-Stone Output Declined During 1935

The total amount of stone reported in 1935 as sold or used by producers amounted to 83,256,440 short tons valued at $87,883,826, a decrease of 9.6 per cent. in quantity and 11 per cent. in value, compared with 1934, according to the U. S. Bureau of Mines.

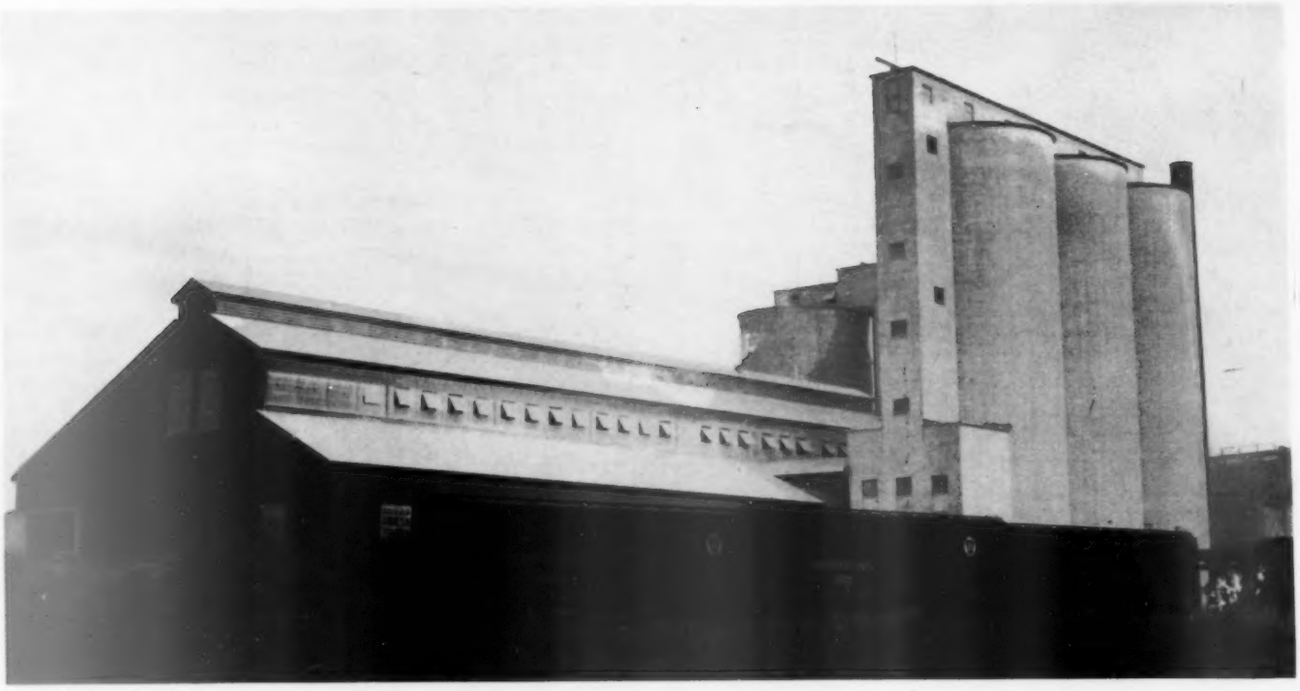
Crushed and broken stone, which amounts to about 98 per cent. of the total output and includes riprap, crushed stone for concrete and road metal, railroad ballast, metallurgical stone (fluxing stone), agricultural limestone, refractory stone, and for various chemical and manufacturing processes, amounted to 81,792,970 tons valued at $72,332,013, a decrease of 10 per cent. in quantity and 12 per cent. in value. Crushed-stone aggregates for concrete and road metal and railroad ballast amounted to 54,754,520 short tons valued at $48,899,982, a decrease of 10 per cent. in quantity and 13 per cent. in value. Of this, 38,090,660 tons (70 per cent.) was produced by operators of commercial quarries and 16,663,860 tons (30 per cent.) by noncommercial operators. The commercial production decreased 12 per cent. in 1935 from 1934 and the noncommercial production 4 per cent.

The total average value in 1935 was 89 c.; in 1934 93 c. Fifty-six per cent. of the crushed stone was transported by truck, 33 per cent. by railroad, 10 per cent. by water, with 1 per cent. unspecified. The stone crushed for concrete and road metal amounted to 49,487,510 tons valued at $44,888,513; for railroad ballast, 5,267,010 tons valued at $4,011,469; a decrease of 10 per cent. in the quantity of stone for concrete and road metal and 1 per cent. in the quantity of railroad ballast. Of the other crushed-stone products, stone for fluxing (12,191,660 tons valued at $7,902,717) increased 32 per cent. in quantity; agricultural limestone ($2,140,370 tons valued at $2,656,728) increased 33 per cent; refractory stone (961,140 tons valued at $1,154,831) increased 42 per cent.; stone for manufacturing industries (5,835,290 tons valued at $5,251,820) increased 9 per cent.; and riprap (4,919,110 tons valued at $4,494,514) decreased 19 per cent. in quantity.

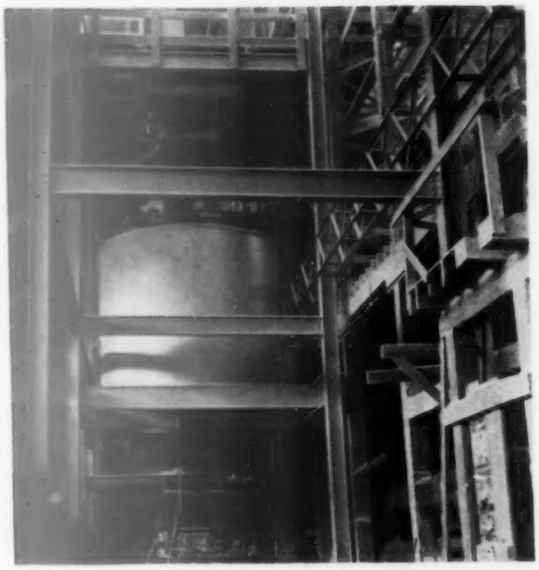
## Nepheline Syenite Is Purified Magnetically

Nepheline syenite is somewhat of a trade name for feldspar containing a high percentage of alumina. This material runs as high as 25 per cent. alumina contrasted to 15 per cent. alumina for ordinary feldspar. Nepheline syenite and feldspar are used in the manufacture of glass. This material is bought on the basis of the alumina content so that it can readily be seen that nepheline syenite brings a premium.

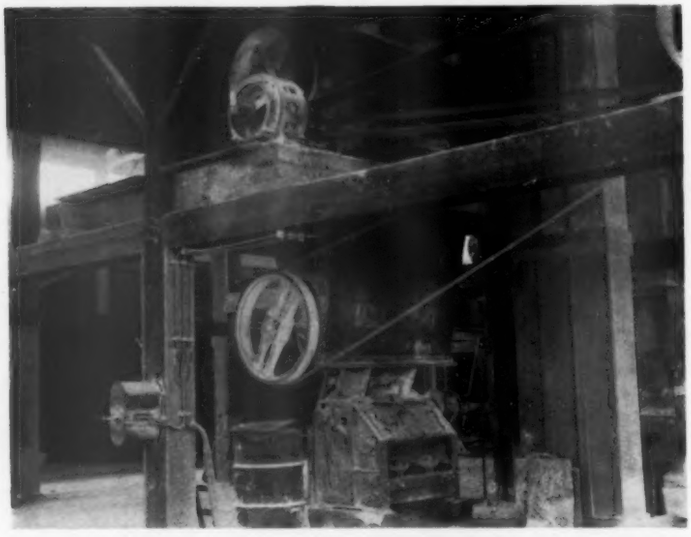
Before the last year or so all the known nepheline syenite deposits contained a very high percentage of iron content, which was disseminated through the material and which could not be removed by any known process. However, during the past year and a half a company in Ontario, Can., started to produce nepheline syenite. After considerable experimentation engineers managed to reduce the iron content of the spar from more than 1 per cent. to less than .05 per cent. consistently. This is accomplished by a Dings super high-intensity Type IR magnetic separator. This type of machine separates magnetically materials which heretofore have been considered non-magnetic.

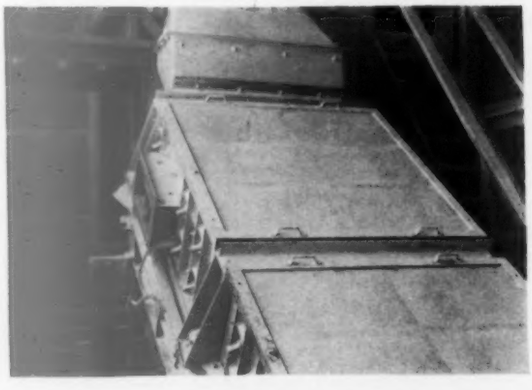


The new processing building and storage silos for hydrated lime and quicklime of the National Mortar & Supply Co. BELOW—The ¾-ton mixer and bagger for producing fibered lime.



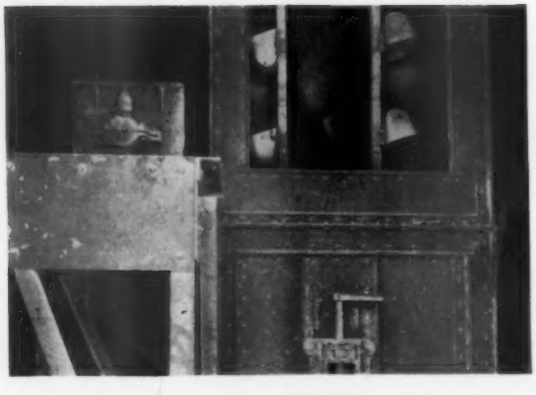
The quicklime pulverizing-and-screening plant showing screw conveyors, elevator, bin and packer. Spout at lower left loads bulk lime into box-cars.



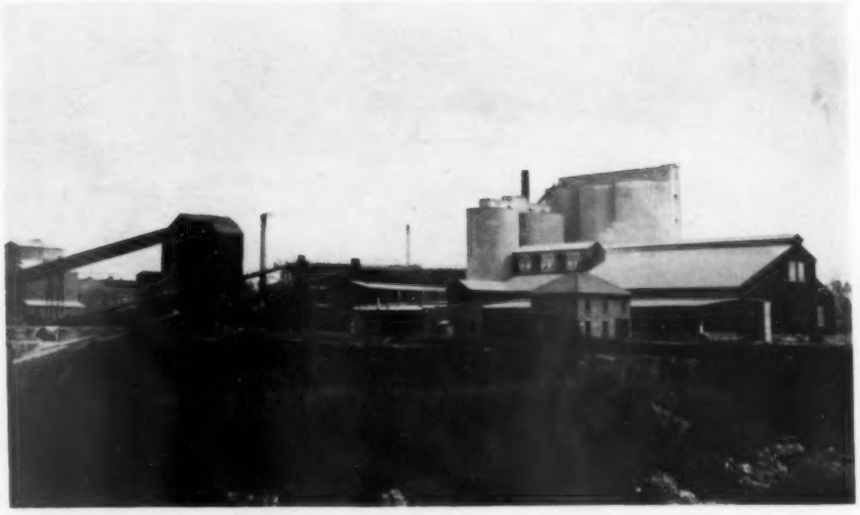


LEFT—Inclosed electric-vibrating screen in quicklime - pulverizing department.

RIGHT—Collecting screw from hydrated-lime silos discharging into elevator boot.



General view of the Gibsonburg plant. Covered conveyor leads to commercial-stone works; the other two inclines from quarry supply the two banks of lime kilns.



# Ohio Lime Producer Completes Notable Modernizing Program

NATIONAL MORTAR & SUPPLY CO. recently completed an extensive rebuilding and modernization program at its Plant No. 1 at Gibsonburg, Ohio. This Plant No. 1 was built by the company in 1907, when it first started making hydrated lime at Gibsonburg. The recent changes involved the expenditure of about $150,000, rounding out a program extending over the past three or four years that involved the investment of about $250,000. The latest improvements included the erection of five large reinforced-concrete storage tanks for quick and for hydrated lime so that large tonnages will be available for shipment at any time. The storage of hydrated lime also improves the quality of this product by aging or curing.

New conveying and elevating equipment and a new crushing circuit were also installed. The existing hydrating plant was not changed but the old building was replaced by a new and larger structural-steel building which houses all the processing and loading facilities.

The company began a program of modernization at this plant about four years ago when an automatically-stoked gas-producer was installed. At that time modern coal-handling equipment and new kiln-gas mains were also added and all the kilns were completely relined and insulated. The program was then continued late in 1935, when the above-mentioned additional improvements were started. This plant is now in condition to take advantage of future increases in demand.

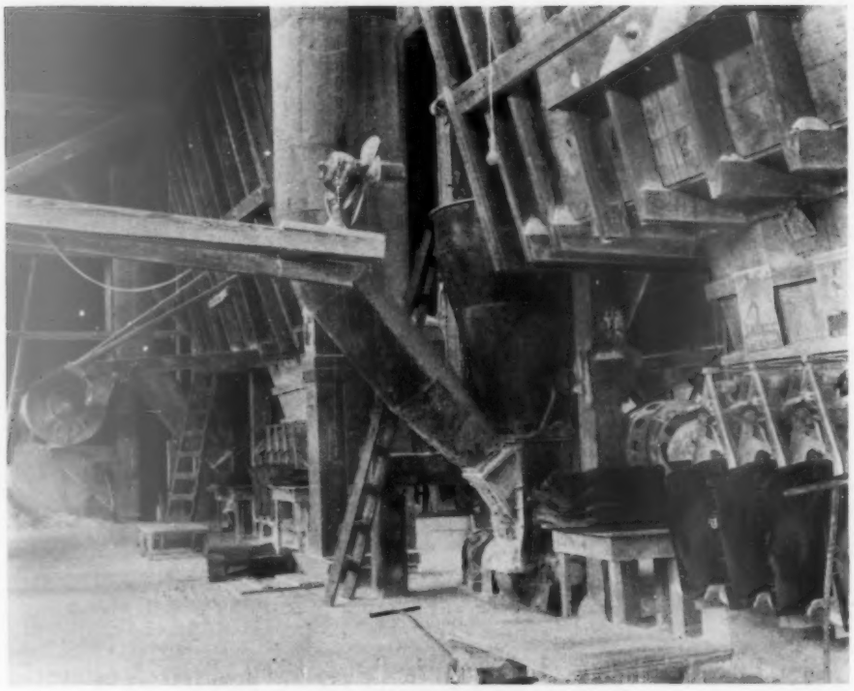
As mentioned, bulk storage of the semi-finished hydrated lime allows seasoning or curing. It is given the finishing process through air separators immediately before shipment and is only packed in paper sacks on orders ready for shipment.

Formerly the plant had storage space for about 1,000 tons of bagged hydrated lime and was forced to adjust its kiln production to changing current demands since large tonnages were never stored in sacks except immediately before seasons of "peak" demand. Starting up and shutting down the kilns is troublesome and expensive and to a certain extent interferes with the standard of quality which this plant maintains. Now there is sufficient storage capacity so that a fairly steady number of kilns can be kept in operation throughout the year.

A brief description of operations preceding the new and improved portions of Plant No. 1 is presented to give the reader a clear picture of the scope of this work. Cars are loaded in the quarry by hand or steam shovel. During the depression the loading was done almost entirely by hand labor to provide employment for the company's full personnel. The loaded cars of 2-cu.yd. capacity are hauled up separate inclines for each of the two rows of 10 vertical kilns. These are steel-shell, brick-lined kilns, each having a capacity of 10 to 12 tons daily, and all are fired by a single Woods gas-producer. It has been the company's experience that producer gas gives better control of the burning than when kilns are hand-fired with coal. Cleaner combustion means no contamination of the lime by sulphur and furthermore is important as the plant is on the edge of Gibsonburg. Lime is drawn from the kilns into a gasoline-motored draw cart. Laid along a pan conveyor which is set below floor-level, it is carefully picked before going to the primary crusher. Large cores are returned to one of the kilns for reburning while small cores are rejected. The plant from this point on was affected by the most recent improvement program.

Quicklime pulverizer which discharges to the elevator supplying the screens.

The pan conveyor discharges the lump lime into a Sturtevant mill which is in a new location. The crushed lime is fed to a 90-ft. Webster chain-bucket elevator, which discharges it into the center of a 12-in. Webster screw-conveyor that is 43 ft. long and has opposed flights. Through two openings in each flight the lime is discharged into the two reinforced-concrete quicklime storage silos which are 30 ft. in diameter and 80½ ft. high and hold 1,800 tons each. Quicklime is reclaimed through the conical bottoms of these silos by Fred Raymond roll feeders, one under each silo. These feeders are of the slotted-roll type used on all Raymond mills. A 12-in. by 21½-ft. Webster screw-conveyor under each silo feeds the lime to a 12-in. by 30-ft. Webster screw-conveyor, which discharges it into a bucket-elevator feeding the 20-ton hydrator-feed bin. The hydrators are Lauman continuous-type units of 12-



View of the hydrated-lime pulverizing and packing floor. One of the hydrators is at the left.

tons per hr. capacity each. These hydrators with their feed bin and elevator are part of the old plant lay-out. The hydrated lime is discharged to another bucket-elevator. The old seasoning system remains intact and can be used if desired. Under this set-up the hydrated lime is discharged from the elevator into two banks of three 100-ft. screw-conveyors each. The lime is carried back and forth in these screws to Raymond mill-feed bins. This system aërate it before it is discharged into the was an improvement over current methods.

The new system ties in at the bucket-elevator from the hydrator, where the lime is discharged through a selective spout into a 12-in. by 65-ft. Webster screw-conveyor. This has vents which allow any steam generated by the hydration of the lime passing through it to escape, thereby eliminating sticking of the lime in the conveyor. A 90-ft. Webster bucket-elevator raises the lime to the center of a 12-in. by 90-ft. Webster screw-conveyor with opposed flights. The hydrated lime is discharged from this screw into the three reinforced-concrete seasoning silos.

These silos are 33 ft. 8 in. in interior diameter and 89 ft. high and each has a capacity of 1,500 tons of unfinished hydrate. Under each silo are four openings provided with Raymond 12-in. by 12-in. by 24-in. roll feeders. Each of two 12-in. Webster screw-conyevors 100 ft. long takes the discharge from two of the four feeders under each silo. One of these screws discharges by gravity and the other by means of a 12-in. by 13-ft. Webster cross screw-conveyor into a 33-ft. Webster bucket-elevator. The elevator discharges the seasoned hydrate into a 12-in. by 54-ft. screw-conveyor which empties into either one or both of the lower two old 100-ft. seasoning screws for conveyance to the Raymond mill-feed bins. If desired, all the lime from both the hydrators can go through either the old or new seasoning system or lime from one hydrator can go through one system and that from the other through the other system.

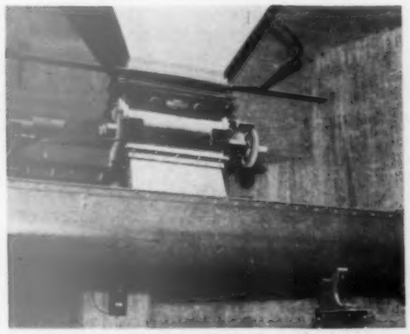
The two mills are Raymond Type O air-swept pulverizers whose product goes to two bins feeding two 4-tube Bates-packers. One of these packer-bins has a roll feeder which can discharge the lime into an elevator feeding a bin over an Ehrsam ¾-ton mixer in which hair is added to the lime. This fibered lime is bagged by another machine and is used as a base coat on interior walls.

Another improvement was the installation of more modern equipment for increasing the production of fluxing lime for the glass trade. A second compartment of the hydrator-feed bin has been arranged to discharge quicklime through a chute into a 52½-ft. Webster bucket-elevator which discharges it on a 4-ft. by 10-ft. Tyler 400 double-deck screen. At present only one deck of this screen is used and this is fitted with 10-mesh wire cloth. Lime retained on this screen is chuted to a Stedman Type A 24-in. by 20-in. pulverizer. The crushed lime is then fed by a 12-in. by 6-ft. screw-conveyor to the elevator feeding the above screen. The minus 10-mesh quicklime passing through this screen is discharged into a 15-ton, 2-compartment steel bin. A 10-in. by 10-ft. Webster screw-conveyor can load this lime through a spout into box-cars or it can be discharged by gravity from the bin into a 2-spout Valve Bag packer. The capacity of this department was increased from 7 tons to 15 tons per hr.

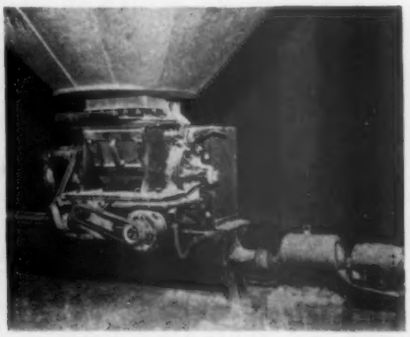
When desired, the second deck of this screen can be used to produce an extremely fine material which would be carried into the second compartment of the car-loading bin described in the preceding paragraph.

Another crushing system, which will be used to pulverize the hydrator and mill tailings, is now contemplated.

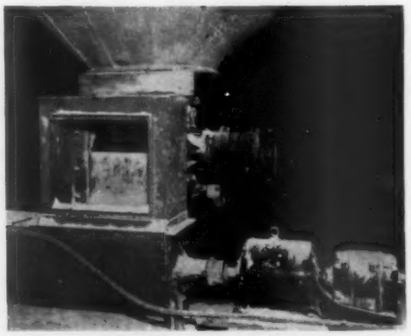
*(Continued on page 53)*



One of the twelve 12-in. by 24-in. roll-feeders which take hydrated lime to screw conveyors.



One of the three roll-feeders which transfer quicklime from silos to screw conveyor.



Another view of one of the quicklime feeders opened to show its operation.

By W. E. TRAUFFER

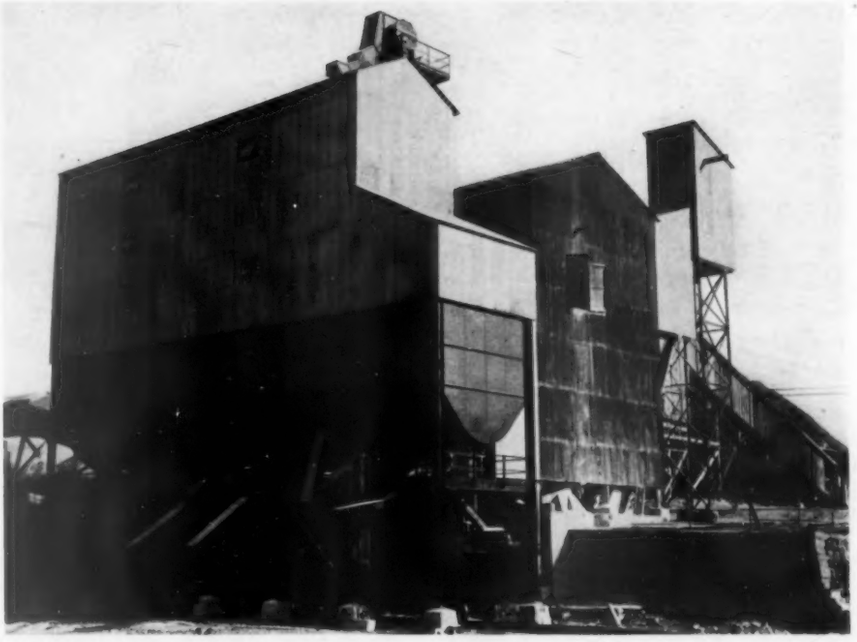
# REVAMPS COMMERCIAL-STONE PLANT

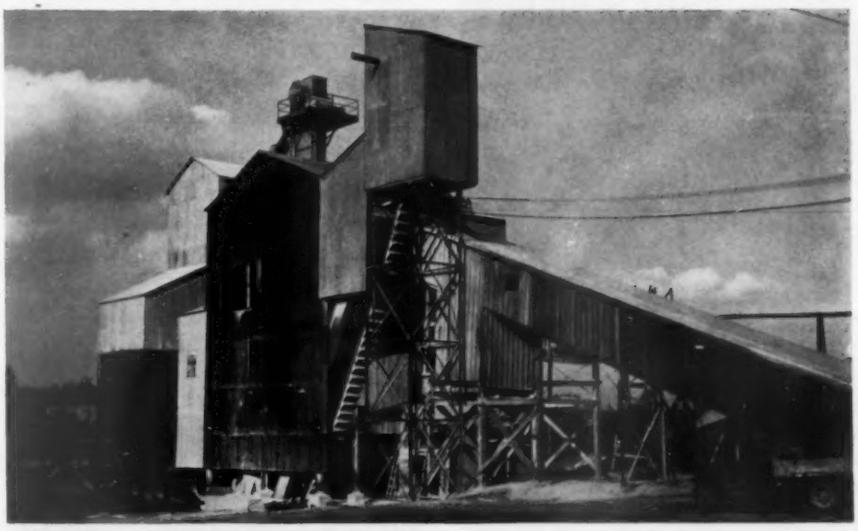
THE Bessemer Limestone & Cement Co. has for the past several years been carrying on an improvement program affecting practically every part of its operations at Bessemer, Lawrence County, Pa. The rebuilding of various departments of the cement plant and the installation of the most modern types of equipment in these departments is now almost completed. Incidental to this program was the construction of a complete new commercial crushed-stone plant which also contributes to low-cost preparation of the cement raw material.

The company had been a producer of commercial crushed stone for many years but from 1933 on did not push this material because of the small market. In 1935 the old plant was replaced by a preliminary crushing and screening plant for the production of cement rock and flux. The old primary crusher and building, the main belt-conveyor, the gyratory secondary crusher and the bucket-elevator which returned material to the main elevator were retained from the old plant. Two revolving screens from the old installation were later replaced by two vibrating screens. A hammer-mill was installed for the final reduction of the cement rock. When only cement rock or flux is in demand, this part of the plant can still be operated independently and has a capacity of 250 tons per hr.

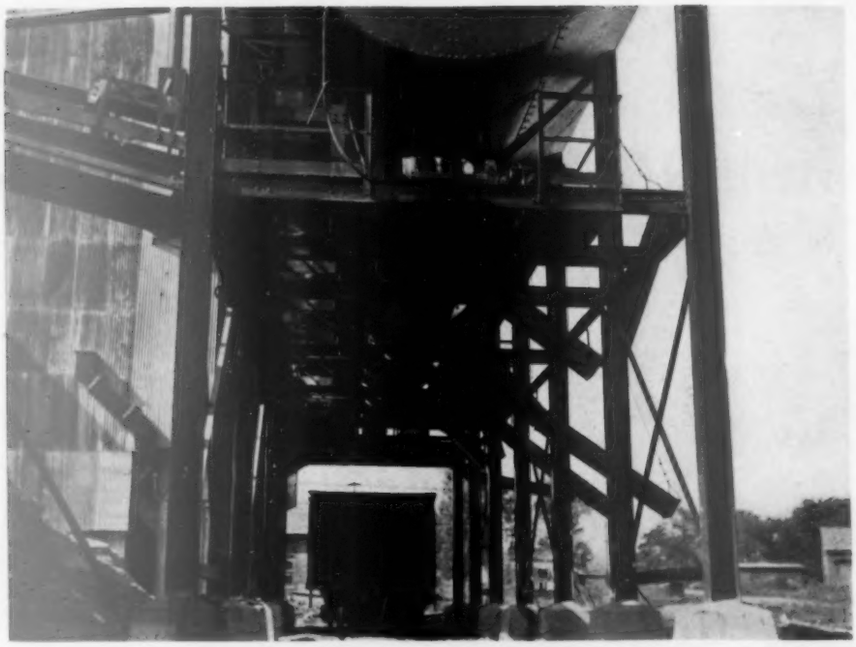
The present commercial screening and washing plant was then added to tie in with the existing facilities. This plant went into operation in May, 1936, and has a commercial-stone capacity of 150 tons per hr.

The outstanding feature of these combined operations is their absolute flexibility which has been attained without undue complication. The number of equipment units required is astonishingly small and the plant is unusually compact for an operation of this capacity.





**ABOVE: The crushing and screening plants of the Bessemer Limestone & Cement Co. with new commercial stone plant at left. CENTER: Another view of plants with conveyor from primary crusher at right. BELOW: Trainload of stone being weighed before discharge to primary crusher.**



View under commercial-stone plant bins showing loading conveyors. Cross conveyor at left feeds cement-plant conveyors.

As stated above, the original plant can be devoted entirely to the production of flux and cement rock, when the demand for commercial stone is low. When the cement-rock storage at the cement plant is full, all the material can be passed through the newer plant and

The revolving scrubber through which all commercial stone is passed.

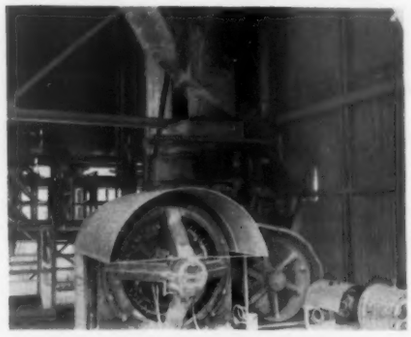
processed to commercial sizes. Also when operating under either of the above conditions, any desired percentages of any selected sizes of material can be produced. Provisions are also made for the reduction of any size of finished material to any smaller size. Cement rock is produced at unusually low cost, when the commercial plant is in operation, as this material is screened out of the total without the usual necessity of crushing all the rock to this size.

Limestone is brought from the quarry in 20- and 25-cu.yd. Western air-dump cars hauled by steam locomotives. The cars are weighed as they pass slowly over a Howe track scale at the plant for a record of quarry production. After being weighed the stone is discharged into the Allis Chalmers No. 24 Gates primary gyratory crusher which reduces it to 6 in. minus. A 48-in. inclined belt-conveyor, which, like all the other belt-conveyors, uses Goodyear belting, discharges the stone on two Allis-Chalmers 4-ft. by 14-ft. triple-deck vibrating screens fitted with 4½-, 1¼-, and ⅝-in. wire cloth.

When cement-plant rock is the principal product, the material retained on the 1¼-in. decks, fluxing stone, is carried on a 40-in. horizontal belt-conveyor to the bin for this product. The oversize material is chuted to an Allis-Chalmers No. 8 Gates Style K crusher set to produce 5-in. minus material. A 30-in. bucket-elevator returns this material to the main conveyor for resizing. The material retained on the bottom decks of these screens is chuted to a hopper from which a Ross chain feeder controls its discharge into the Dixie Size 5060 hammer-mill. The mill product is ¾-in. minus and is discharged on the first of a series of 20-in. belt-conveyors which carry it a distance of 805 ft. to the cement-plant raw-material storage building. The minus ⅝-in. material passing through these screens by-passes the hammer-mill and goes direct to this conveyor system. If desired, the oversize stone coming from these screens can be chuted to the hammer-mill for reduction, as can also the fluxing stone, by reversing the 40-in. conveyor which ordinarily carries it to storage.

The hammer-mill which produces rock for the cement plant.

When commercial stone is in demand, the minus ⅝-in. material from



The 4-ft. cone crusher used for reduction of commercial stone.

the first pair of screens by-passes the hammer-mill and goes to the cement-plant storage conveyors, the flux goes to storage, and the oversize material is recrushed as before. The material ⅝ to 1¼ in. in size retained on the bottom decks of this first pair of screens, however, is chuted either to a Symons 4-ft. cone crusher for reduction to any desired top size, or direct to the follow-

View showing conveyor under bins and chute to return conveyor to crushers.

ing elevator. An 84-ft. Webster steel-inclosed vertical chain-bucket elevator can discharge this material either through a chute direct into a bin as foundry stone or into a 50-ton surge bin from which a drop-chute gate feeds it to a 30-in. Webster inclined pan conveyor. This discharges the rock into a 6-ft. by 16-ft. 6-in. Webster revolving scrubber equipped with a 5-ft. dewatering exten-

sion having $^3/_{16}$-in. perforations. Material under $^3/_{16}$ in. in size goes by gravity to a Webster 16-in. double-screw washer and dewaterer. The dewatered fine material is discharged into a bin for use as stone sand, or it can be chuted to a 20-in. cross belt-conveyor feeding the cement-plant conveyors for use as cement rock.

The coarse material from the scrubber is chuted to a 4-ft. by 12-ft. Allis-Chalmers double-deck Low Head horizontal vibrating screen. A great variety of cloth sizes can be used on this screen to meet Ohio or Pennsylvania specifications which differ on practically all sizes. The material retained on the top deck of this screen is chuted into a bin or into the Symons crusher for reduction in closed circuit. The material retained on the bottom deck goes to a bin. The material passing through the bottom deck goes to a 20-in. belt-conveyor which can discharge it into either a bin or a second 4-ft. by 12-ft. Allis-Chalmers

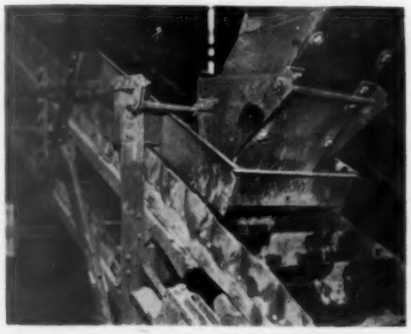
The double-screw washer alongside one of the two low-head screens.

double-deck Low Head screen. All the three sizes from this screen are discharged into bins.

The storage consists of a round-bottom steel bin having six compartments of 150 tons capacity each. Bin compartment No. 1 is used for stone sand, compartments No. 2, 3 and 4 are used for commercial aggregates, No. 5 is used for flux and No. 6 for foundry stone. Bottom-discharge gates and chutes are used for loading these materials direct into cars or trucks for shipment. Bins 1, 2, 3 and 4 also have gates which discharge on a 40-in. reversible horizontal belt-conveyor used for loading either single or mixed sizes into cars. Each of the 6 bins also has a gate which can discharge on a 20-in. reversible horizontal belt-conveyor. This in turn discharges on a 20-in. cross belt-conveyor feeding the inclined bucket-elevator. In this manner any stored material can be reprocessed to any desired smaller size. By reversing this 20-in. conveyor under the bins any stored material can be fed to the 20-in. inclined cross belt-conveyor which discharges on the cement-plant

**TABLE OF EQUIPMENT, MOTORS AND DRIVES**

| Unit | Description | Motor | Drive |
|---|---|---|---|
| Primary crusher | Allis-Chalmers Gates No. 24 | 150-hp. | Flat belt |
| Main conveyor | 48-in. by 226-ft. | 75-hp. | Flat belt and gear |
| Coarse sizing screens (2) | Allis-Chalmers 4- by 14-ft., 3-deck | 10-hp. A-C | Texrope |
| Secondary crusher | Allis-Chalmers Gates No. 8 | 75-hp. A-C | Flat belt |
| Return elevator | 30-in. by 69-ft. | 40-hp. A-C | Texrope and gear |
| Flux conveyor | 40-in. by 40-ft. | 10-hp. G. E. | Texrope |
| Chain feeder | Ross | 5-hp. G. E. | James reducer |
| Hammer-mill | Dixie Size 5060 | 300-hp. A-C Synchronous | Direct |
| Reduction crusher | Symons 4-ft. cone | 100-hp. A-C | Texrope |
| Wash plant elevator | Webster 20-in. by 84-ft. | 40-hp. A-C | Falk reducer |
| Pan conveyor | Webster 30-in. by 21-ft. | 5-hp. G. E. | Falk reducer |
| Scrubber | Webster 6-ft. by 16-ft. 6-in. | 50-hp. | Falk reducer and gear |
| Washer | Webster 16-in. double-screw | 10-hp. West. | Texrope |
| Cement cross conveyor | 20-in. | 3-hp. | Falk reducer |
| Final sizing screens (2) | Allis-Chalmers 4- by 12-ft., 2-deck Low-Head | 7½-hp. A-C | Texrope |
| Screen conveyor | 20-in. by 25-ft. | 3-hp. G. E. | Falk reducer |
| Car-loading conveyor | 40-in. by 50-ft. | 10-hp. West. | James reducer |
| Reclaiming conveyor | 20-in. by 70-ft. | 5-hp. G. E. | Falk reducer |
| Cross belt-conveyor | 20-in. by 26-ft. | 3-hp. | James reducer |



Gate on chute from elevator feeding to pan conveyor to revolving scrubber.

conveyors. All car shipments are weighed on another Howe track scale. It is planned to install a conveyor system to a ground storage for commercial aggregates.

The conveyor system from the crushing plant to the cement-plant rock-storage building consists of a series of three belt-conveyors. These conveyors are, in order, 24-in. by 250-ft., 20-in. by 240-ft., and 20-in. by 315-ft.

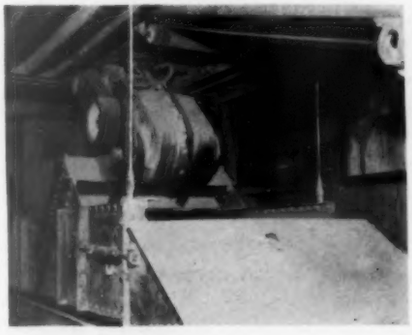
The electrical control of this plant is as modern as its design and mechanical equipment. Each unit has both local and centralized controls. An automatic interlock immediately shuts down the hammer-mill and its chain feeder in case of a breakdown in the conveyor system to the cement-plant. The synchronous motor driving the hammer-mill is responsible for a high power factor in the system.

Water used in the washing plant is supplied from the cement-plant storage tank located on a hill above the plant.

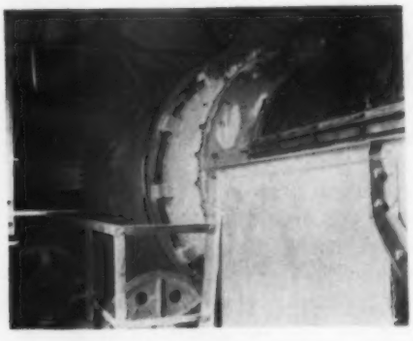
*(Continued on page 53)*

The two vibrating screens which perform preliminary separation of stone.

One of the two low-head vibrating sizing screens.



Another view of final sizing screen showing inclosed drive.



Another view showing drive of the revolving scrubber.

# Associations Launch Protest Against Higher Freight Rates

FORMAL protest against the plea of the railways for higher freight rates on crushed stone, sand and gravel and slag was filed on November 6 with the Interstate Commerce Commission by the three mineral-aggregates associations — the National Crushed Stone Assn., the National Sand & Gravel Assn., and the National Slag Assn. This took the form of a reply to the petition of the carriers for authority to file with the commission tariffs incorporating the proposed increases on sand and gravel rates outlined in PIT AND QUARRY for November.

The petition of the carriers was the first formal step by the railroads to carry out their program to secure permanent increases in rates on practically all commodities. It was necessary for the carriers to file the petition to which this reply was addressed, because of numerous orders by the commission fixing maximum rates and ordering the carriers to maintain no higher rates until further order of the commission. Therefore, filing of a tariff containing a higher rate would be in violation of such outstanding maximum rate orders. What the carriers sought by their petition is consent to a modification of such orders, in order that they might lawfully file with the commission in due form the proposed tariffs naming increased rates.

If the commission grants the carriers' petition, the new tariffs containing proposed increased rates will be subject to protest and request for suspension. By its order of October 23 the commission accepted and docketed the petition of the carriers, gave organizations representing shippers an opportunity to file a reply by November 7, and then ordered that parties replying to the petition might, if they desired, have their reply treated also as a protest and request for suspension in the event the carriers' petition for modification of outstanding orders is granted.

If this reply should be effective and the commission should deny the carriers' petition to file tariffs proposing increased rates on mineral aggregates, then that would terminate these industries' interest in the proceeding. But if the petition is granted, the way is open for the carriers to file the tariffs containing the proposed increased rates. Anticipating that possibility, the reply has been so worded as to constitute itself a request for suspension of all relevant tariffs. If the commission suspends the tariffs, the matter goes to hearing, evidence is taken, and decision will be made by the commission as to whether the proposed increases shall take effect. If suspension is refused, the increased rates go into effect at the time named in the tariff.

The complete text of the reply follows:

This presentation is made on behalf of producers and shippers of crushed stone, sand and gravel, and slag in the entire United States. The organizations joining herein are voluntary associations of their respective industries, the functions of which are to act for their industries in matters of common interest to their respective industries.

In many proceedings before your commission the undersigned petitioners have expressed their direct and earnest interest in any program designed to effect an increase in revenue for the carriers. This interest in their welfare is prompted not only by our realization of the interrelation between railroad stability and a sound economic structure for the industry as a whole, but even more specifically because of the circumstance that the railroads are purchasers of our commodities in an important degree, and therefore as the soundness of their financial position is improved there is a wider market for the products of our industries.

In fairness to the carriers as well as to ourselves, however, we must call attention to the fallacy of anticipating higher incomes from the transportation of the products of our industries by the assessment of higher rates on a rate structure which is already overburdened and which has amply demonstrated that without special consideration of the freight-rate structure so far as our industries are concerned higher rates will disturb the normal flow of traffic and will drive our products, in an increasing degree, to competing forms of transportation to the financial loss of the carriers and with a corresponding injury to your petitioners, because so many of our plants have been designed for railroad loading.

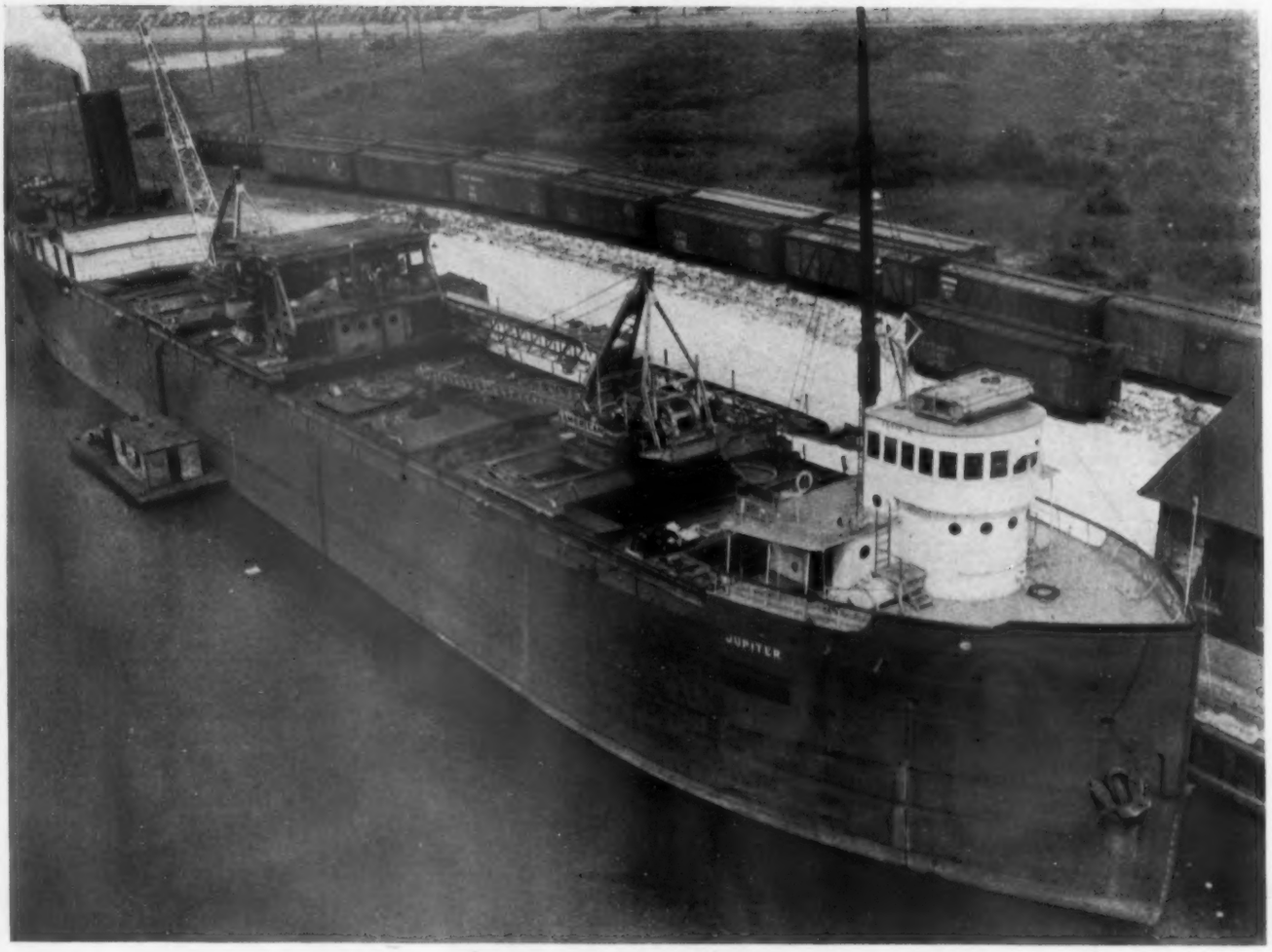
Your petitioners do not feel competent to comment upon the wisdom or desirability of granting the application of the carriers for permission to file higher tariffs on products of other industries, but we do submit that the records of the commission itself clearly indicate that within the last several years the movement of the products of our industries by railway has seriously declined as a direct result of a freight-rate structure too high to resist the new developments in water and truck transportation. As an illustration of the soundness of our position the products of our industries are unable to bear such increases in rates as are suggested in the petition of Class I railroads, we call to the attention of the commission that in 1928 the railroads handled 47.9 per cent. of the total production of our industries and in 1934 they handled only 25.9 per cent. Such a decrease in the percentage of the products of our industries moving by railways leads to the inevitable conclusion that a further increase in the rate structure will result in an acceleration of the decline of the railway movement of our commodities. Hence, the objective which the carriers themselves seek as to increasing of their revenue, and with which the undersigned petitioners are in sympathy, will not only be defeated, but the revenue obtained from the movement of the products of our industries will be substantially lessened.

For these reasons and in reference only to the industries represented by the undersigned organizations, we urgently request that the petition of Class I carriers for the filing of tariffs proposing higher rates on our products, be denied. If the relief sought by the carriers in their petition of October 23 should be granted by the commission, we then respectfully request that our petition now submitted be accepted as a request for suspension of tariffs or items thereof which propose increases in the rate structure on our products.

Respectfully submitted,
NATIONAL CRUSHED STONE ASSN.
By J. R. Boyd,
Administrative Director.
NATIONAL SAND AND GRAVEL ASSN.
By V. P. Ahearn,
Executive Secretary.
NATIONAL SLAG ASSN.
By H. J. Love,
Managing Director.

**VICTORY!**

**The protest filed by the three associations here mentioned helped to bring about a victory. A story on the Commission's rejection of the railroads' proposal which was handed down Nov. 19 appears on page 35.**



# S.S. "Jupiter" Goes Into Service as Sand Producer on Great Lakes

By HARRY F. UTLEY

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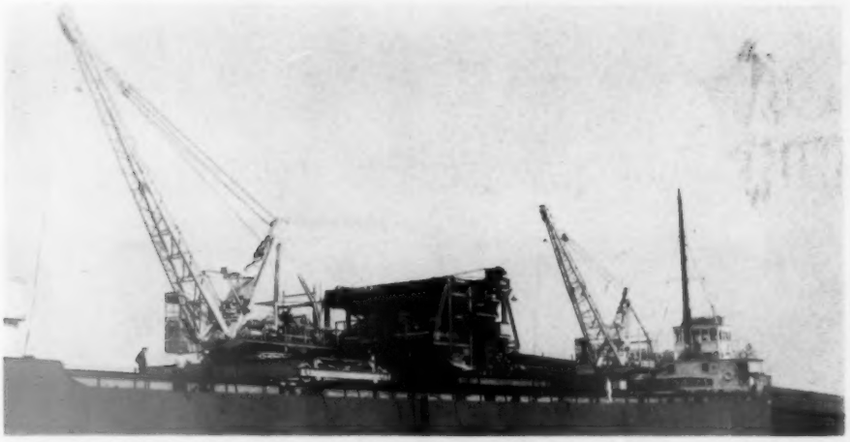
ONE of the most compact and flexible floating sand-and-gravel plants ever to operate on the Great Lakes went into service in September, when the S. S. *Jupiter,* owned by the Great Lakes Silica Corp., steamed out of the Calumet River at South Chicago, Ill., to take on its first cargo of material.

The *Jupiter* was purchased by the Great Lakes Silica Corp. from the Interlake Steamship Co. in whose service it had operated for more than a score of years as a bulk freighter, plying the lakes as a coal and iron-ore transport.

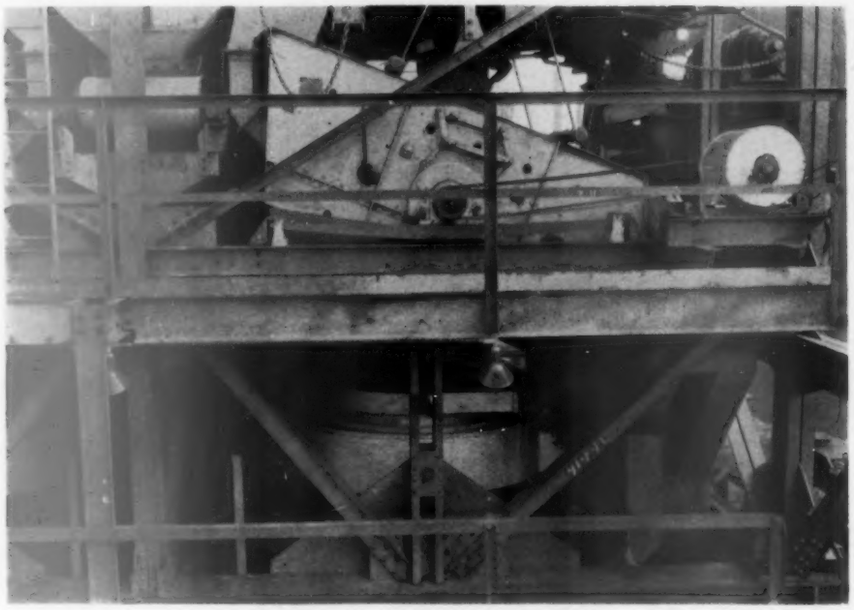
The work of converting the all-steel vessel into a sand or gravel producer, carrier and self-unloader was done in the Rock Island slip of the Calumet River in South Chicago. All the screening, washing, loading and unloading equipment is above decks and the hold has a capacity of 5,600 tons. While all commercial sizes of sand and gravel can be produced, the *Jupiter* will be used almost exclusively in the production of industrial sands. The boat is steam-driven, has a 380-ft. keel, 48-ft. beam and the hold is 23 ft. deep. A crew of from 25 to 30 men will be required to operate the vessel and the material-handling equipment.

Two American Hoist & Derrick Co. revolving cranes with the latest Bendix-Westinghouse air-controls and each equipped with 2½-cu.yd. Williams alloy-steel clam-shell buckets are used to bring up the material. Hoisting drums on the cranes carry sufficient cable to allow the buckets to drop 60 ft. below the surface of the water. The buckets discharge the material over grizzlies into four adjacent hoppers above the screening-and-classifying plant. Reciprocating feeders beneath each hopper pass the material through split chutes to four Stephens-Adamson 5-ft. by 8-ft. heavy-duty vibrating screens. These screens are triple-deck machines but by replacing the middle deck with an alloy-steel veil plate it is possible to operate each as two single-deck sizing units. This method was adopted to achieve compactness in design since the *Jupiter* will be engaged in making sand of one certain size on each trip. Oversize material is chuted back into the lake.

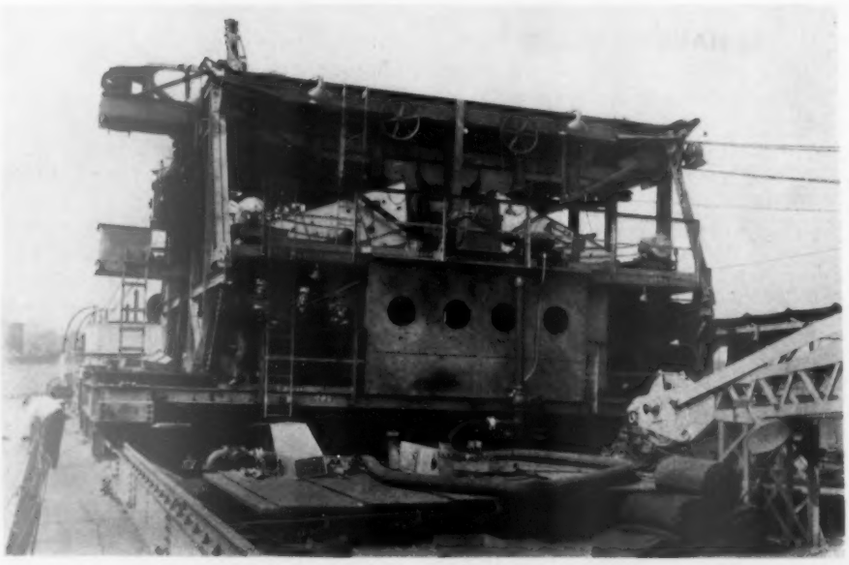
The material, as it passes over and through the screens, is washed by non-clogging spray nozzles of a new type recently introduced by the Link-Belt Co. Curved bronze deflectors are fitted



The screening plant, located amidship on deck, and the two revolving cranes which recover and reclaim the material.



One of the four sets of vibrating screens and classifiers.



Looking along the deck at the fore end of the screening plant.

to the 2½-in. water-supply pipes and these break up the streams into fine, fan-shaped sprays which clean the material thoroughly.

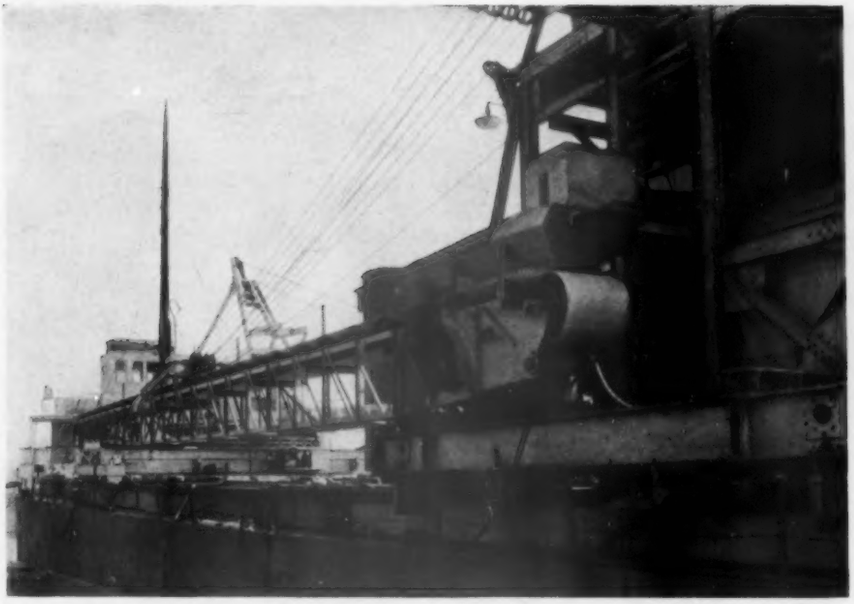
Beneath the four Vibrators are four 5-ft. Auto-Vortex classifiers. These cones extract the fines and water from the material passing the screens, discarding them overboard through the same chutes which carry away the rejects from the screens. The finished product is dropped through automatic gates at the bottoms of the cones into the hold below.

Both the cranes and the screening plant are movable, being mounted on flanged wheels which travel on standard 80-lb. rails spaced 37½ ft. apart. There are ten telescoping hatches on deck, each 24 ft. by 10 ft. in size, and the screening plant can be moved as desired over the hatches to distribute the load in the hold. Both cranes travel over the rails under their own power and the screening plant is moved by attaching chains to either crane. All the equipment is fitted with hold-down rail clamps for stability and as an additional safeguard is held firmly by turnbuckles which are fastened to eye-bolts welded to the deck.

In unloading, the cranes reclaim the material from the hold through the hatches and discharge the sand into the same hoppers above the screening plant that take the raw material. Deflector gates beneath the hoppers are placed in service during the unloading, however, and the sand instead of going to the screens passes to a short belt-feeder. There are two of these feeder belts, each carrying the sand from two of the four hoppers *via* the reciprocating feeders to the center of the screening plant where they discharge on a 24-ft. reversible belt-conveyor mounted at right angles to the center line of the boat. This cross conveyor delivers to a 110-ft. swinging-boom belt-conveyor which unloads the material on the shore. Two Merrick Weightometers on the 24-ft. cross conveyor record the tonnage of the material unloaded.

The boom conveyor can be placed at either the port or the starboard side for unloading and is lifted into position by the cranes. The boom hoist is located at the fore end of the screening plant and is able to handle the boom working on either side. All conveyor belting is 30 in. wide and was supplied by the Goodyear Tire & Rubber Co.

With the exception of the cranes which utilize steam from the ship's boilers, the entire equipment is electrically-operated. Steam is delivered to the cranes through 6-in. flexible steam hose. A 100-kw. General Electric turbo-generator set in the vessel's engine-room



The unloading boom-conveyor which can be used on either port or starboard side. It is lifted into position by the cranes.

supplies the electric power. The motor sizes used are as follows: reciprocating feeders, 15-hp. each; screens 7½-hp. each; feeder belts 3-hp. each; cross conveyor 10-hp.; boom conveyor 30-hp.; boom hoist 7½-hp. All were supplied by the General Electric Co. An IXL speed-reducer with G. E. automatic disk-brake control is used on the boom hoist, while the drive to the screens is through four-strand Dayton Cog-Belts. The other motors have built-in gears, are fully inclosed and are of splash-proof design. A complete lighting system on deck and in the hold will allow efficient night operation.

Water for washing the material over the screens in the cones is supplied by a Union pump driven by a G. E. steam turbine, also located in the engine-room. The pump has a 10-in. intake and 8-in. discharge and is capable of delivering 2,000 gal. per min. with 85-lb. pressure at the screening plant. Manually-operated valves control the amount of water supplied to each screen and the classifier. The valves and fittings were furnished by the Crane Co.

Since each of the four screening-and-classifying units is equipped with individual water and material control each can operate independently of the others. Should any unit be out of service for any reason the plant could continue operating at 75 per cent. of its capacity.

The screening and conveying equipment was designed and supplied by the Stephens-Adamson Mfg. Co. and was erected, along with the all-steel plant structure, under the supervision of one of its engineers. The classifiers, which are built by the Nordberg Mfg. Co. under the direction of the designer, Charles E. Wood, were installed under the personal supervision of Mr. Wood. R. E. Sheal, a Cleveland, O., engineer was in general charge of the installation for the owners.

The equipment was designed for a loading and unloading capacity of from 400 to 600 tons per hr., depending upon the type of material being produced. Engineers of the Great Lakes Silica Corp. designed the washing-and-screening plant and the general lay-out of the equipment on board the vessel. The company was incorporated early this year for the express purpose of acquiring, equipping and operating the *Jupiter*.

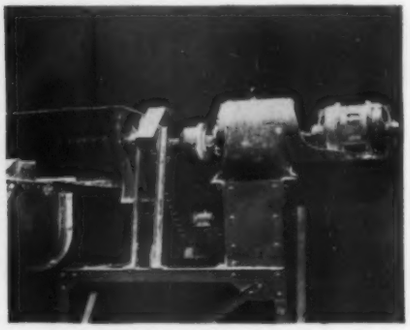
It is expected that the *Jupiter* will operate throughout the Great Lakes, unloading at Chicago, Milwaukee, Detroit, Cleveland, Buffalo and possibly other ports.

## National Mortar

*(from page 46)*

This material will be used for agricultural purposes.

All the described improvements were made under the supervision of Arnold and Weigel, engineers, who designed the project with the coöperation of the companies supplying the equipment. All the new screw-conveyors and elevators were supplied by the Webster Mfg. Co. All these elevators are steel-inclosed and of the chain-bucket type with 12-in. by 6-in. Salem buckets. The new conveyors and elevators are driven through Falk motor-reducers and Westinghouse motors. The new structural-steel processing and loading building was erected by the Pittsburgh-Des Moines Steel Co. and has Robertson protected-metal siding and roofing. The five new reinforced-concrete silos



Motor and reducer drive of reclaiming screw beneath hydrated-lime silos and of the cross screw-conveyor to which it discharges.

were erected by the James Stewart Co., Chicago.

On this property the company operates another plant, No. 2, which has 15 kilns and produces both quicklime and hydrated lime. It was built in 1915. Its quarrying and processing methods are similar to those in Plant No. 1. In 1922 the company built a commercial crushed-stone plant with the primary crusher in the quarry and an inclined conveyor connecting to the screening plant near Plant No. 1.

## Bessemer

*(from page 49)*

On the sand-washer floor is an Allis-Chalmers 3-stage centrifugal pump which acts as a "booster." This pump is rated at 500 gal. per min. and is driven by a 50-hp. Allis-Chalmers motor.

View showing conveyor from first to second screen with screw washer at right.

Both sections of the new crushed-stone plant have Pittsburgh-Des Moines structural-steel frames on concrete floors and foundations and are inclosed with Youngstown corrugated-metal siding and roofing. Steel window sash, doors, floors and stairs are also used. Goodyear conveyor belting is used throughout the plant.

A view of the concrete-brick plant operated at Lithonia, Ga., by the Consolidated Quarries Corp. of Atlanta. In the foreground is the yard storage where the units are air cured after being steam-cured in the kilns. Materials are mixed and the bricks formed in the inclosed building.

# Stone Waste Yields a Profit in Form of Quality Concrete Brick

ANOTHER aggregates producer has found a profitable by-product industry in the manufacture of concrete brick. The Consolidated Quarries Co. of Atlanta is completing the first year's operation of its plant at Lithonia, Ga., and is quite pleased with the market's reception of its product during this time.

The company had accumulated quite a surplus of minus ¼-in. granite at its crushed-stone plant and after considering all possible outlets for the utilization of the material decided on concrete brick. Construction of the plant was started in January, 1936. Operations began in March and the first sales were made a month later.

The plant is a one-story wood-frame structure with corrugated-metal siding and a steel-truss roof. Two steam-curing kilns were built. These are 32 ft. long, 8 ft. wide and 7 ft. high with iron doors running in channels to seal the ends. These doors are counterweighted and can be raised and lowered by one man. The kilns are of rubble masonry with floors and roof of concrete.

The equipment for making the bricks was purchased from the W. E. Dunn Mfg. Co. of Holland, Mich. The concrete-mixer is a 16-ft. shovel type and materials are proportioned and fed automatically. The Dunbrik commercial line-production machine has a rated capacity of 32 bricks per min. The mixer and feeder are driven by a 5-hp. motor while a 2-hp. motor powers the brick machine. All the equipment is controlled from the operating floor. Only minor adjustments and repairs have been necessary so far.

As the units come from the Dunbrik machine they are racked by hand on trucks carrying 600 bricks and are trundled into the steam kilns to be cured for 24 hr. at 150 deg. F. After removal, they are sprayed at frequent intervals for 8 days and are air-dried for a month in the yard before being released for sale.

Sacked cement is unloaded from cars on a spur track and piled on the operating floor, while motor trucks are used to bring in the fine aggregate. A 1:8 mix is employed with constant water-cement-ratio control. The Dunbrik machine makes three standard-size bricks on each pallet while, by removing one separating strip, an 8-in. by 8-in. unit and one ordinary brick can be produced. With both separating strips removed, a single 8-in. by 12-in. block can be produced on each pallet.

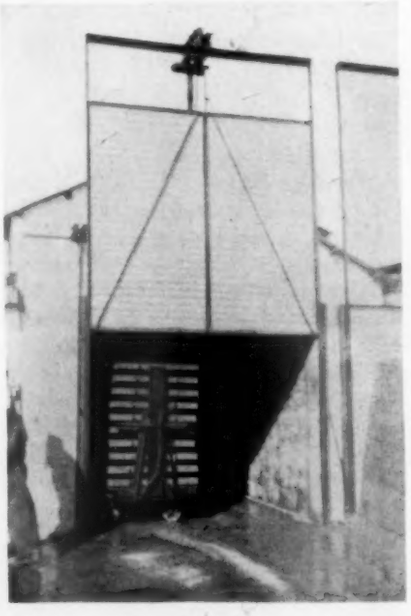
Five men, including the foreman, operate the plant. One man feeds the mixer, operates the charging hoist and controls the mixing-water feed. One man removes the units from the machine and loads them on racks, while two workmen unload the racks and pile the bricks in the storage yard, help load trucks, etc.

According to G. A. Austin, president, the units are of uniform size, color and density with sharp, clean edges and corners. Masons report that they can be laid well, cut cleanly with a trowel and show an average wall strength of 55 per cent. of the unit strength.

Tests made at the Georgia School of Technology, Atlanta, Ga., proved the concrete bricks to be highly resistant to moisture. When immersed in ½ in. of water and standing on end the absorption by capillary attraction did not reach the top of the concrete brick in 72 hr. With two competing types of bricks, one was wet at the top in 2 hr. and the other at the end of 19 hr.

The company sells its output within a 30-mi. radius of the plant and nearly all deliveries are made by truck. Breakage amounts to little and in one instance only seven units were found broken upon delivery on a 13,000-brick order.

The many visitors to the plant are an indication of the growing interest in concrete-brick manufacture by producers, according to Mr. Austin. Most of those who have visited the operation went away enthusiastic over this method of turning material that is otherwise wasted into a substantial profit.



The steam curing kilns showing a rack-truck loaded with bricks and the counter-weighted sealing doors.

Plant and dock of the Hudson River Stone Corp. as seen from the quarry. BELOW—The dust-control equipment on rubber-tired chassis in the quarry.

By
**W. E. TRAUFFER**

# Vacuum Hoods on Drills Reduce Dust Hazard in This Quarry

THE Hudson River Stone Corp. since June of this year has been using a Markley dust-control system on the air-drills in its quarry at Cold Spring, N. Y. This system, which was described on p. 79 of the July, 1936, issue of PIT AND QUARRY, consists essentially of a suction device which collects all the dust created by these drills. The primary purpose of this system is to eliminate the dust hazard to the drill operators. However, according to Pete Rodgers, plant superintendent, the effective and immediate removal of this dust has also greatly speeded up drilling operations and has considerably decreased the wear on the drill steel.

This system was installed in compliance with the requirements of the insurance company with which the company carries occupational-disease insurance for the protection of its employees. The insurance company require the use of this system at all times except when drilling is being done in inaccessible places.

More than 98 per cent. of the rock dust and cuttings from the drilling operations is collected by actual test. The increased drilling speed and the decreased wear of the drill steel per foot of hole drilled are directly dependent on the efficient removal of this material, as the air blown from the drill alone can not efficiently remove all the dust and cuttings from the hole. The dust being entirely removed from the drilled hole permits the drill steel to cut virgin rock at each blow of the piston and this dust being highly abrasive, its absence, due to efficient collection materially increases the life of the drill steel, it being found that by the use of this equipment the steel may be used more than once without re-sharpening. The cushioning effect of the material remaining in the hole lowers the drilling efficiency.

The installation at this quarry is the standard type Markley system for two drills. Dust is drawn from the drill holes by means of hoods which cover the holes and through which the drill steel passes. Special 1½-in. hose connects each of the two hoods with individual preliminary settling tanks which trap all the coarse dust and cuttings. The fine dust passes on into a final separation tank containing bag filters where it is filtered to a point well within the safe hygienic limit. A rotary blower furnishes suction through the entire system.

The blower was originally driven by a 1½-hp. gasoline engine but this has been replaced by an air motor which operates on compressed air from the drill air-lines and requires only 51 cu.ft. of air per min. for operation. The change was made because extra air was available for this purpose and the use of air is no handicap as the system is used only when the drills are operating. Starting troubles and gasoline haulage have also been eliminated and the portability of the system has been increased as the air motor is much lighter than the engine formerly used, weighing less than 7 lb. The tanks, blower and air motor are all mounted on an old automobile chassis with springs and pneumatic tires. This chassis, which was designed by Mr. Rodgers, can easily be moved about the quarry by one man.

One of the jack-hammers in use with the dust-hood. Note freedom from dust.

The same drill in operation at the same location without the dust-control equipment.

By E. W. MELSON
Bausch & Lomb Optical Co.

# DUST CONCENTRATION AND SILICOSIS

THE subject of occupational diseases is increasing in gravity daily. At the 1935 Convention of the International Assn. of Industrial Accident Boards and Commissions, Chairman J. Dewey Dorsett, had this to say: "For months past it has been the subject of intensive study by those who are trying to solve the problem. Silicosis, at the moment, is the outstanding occupational disease with which industry is concerned. It is not a novel disease, but it has increased alarmingly in recent years through exposure incident to the use of modern machinery. In several states silicosis and other occupational diseases have been the subjects for speculative damage-suit litigations between employer and employee, and in quite a number of the states such litigation has developed into a serious and demoralizing 'racket.' In the light of recent court decisions, the present-day viewpoint is changing and the prevailing belief is that occupational diseases, where immediately traced to an occupational origin, should be included as compensable injuries under specific conditions."

More than three years ago, when it became apparent that the subject of occupational diseases was increasing in gravity, the Assn. of Casualty and Surety Executives appointed an advisory committee of five to study the entire problem. This committee has compiled tentative suggestions for provisions to be considered in formulating a plan of compensation for occupational diseases. And at the present time the Industrial Commission of the State of New York, acting under a law enacted this year, is drafting rules and regulations for control of silicosis in the stone industry. Other industries are being considered by an advisory committee. The commission is attempting to formulate a definition of "injurious silica-dust concentration" and a schedule of tests for dust-control equipment.

"As to occupational diseases," says Dr. L. U. Gardner, of the Saranac Laboratory for the Study of Tuberculosis, "and especially those of the progressive type and slow contraction, by reason of the indefiniteness as to time, place, and disability, the problem is so complicated that it is difficult to avoid legislation which will not be retroactive in its effect. Insurance is a protection against future hazards. Industry can not afford to pay for losses which have accrued, nor can the insurance companies afford to give coverage for past liabilities before the law became effective. No reserves have been created to meet the extra burden."

Dust diseases are in a special class. They are of exceedingly slow contraction. They are exceptionally hard to diagnose since they are so often complicated with other diseases. The more serious of the dust diseases are progressive, incurable, tending inevitably though slowly to become worse. They call for special treatment from every point of view, underwriting, engineering, medical, claim, legal and statistical. It is imperative, therefore, that in any compensation plan for occupational diseases there should be special sections and provisions to apply to dust diseases.

At the present time two kinds of dust are generally recognized as possessing the most irritating properties. Silica, commonly found in nature as quartz, is a notorious offender, and asbestos, a silicate magnesium, is as bad, if not worse. A diagnosis of either silicosis or asbestosis depends primarily, says Dr. Gardner, upon a reliable history of adequate exposure to silica or asbestos dust, and upon the demonstration of characteristic changes in an X-ray film of the chest. What constitutes an "adequate exposure"? Authorities suggest that a man must be exposed day after day for a period of years to relatively high concentration of dust. In the usual concentrations of silica dust it takes from 5 to 20 years to produce silicosis; and from 7 to 11 years in asbestos to produce asbestosis. But if the dust concentration is excessive, the time may be shortened to as little as two years. Not only time but dust concentration is an important factor.

The determination of dust concentration has been technical engineering problem involving the use of special apparatus, but there are certain operations where it is safe to assume that dust concentrations are high unless somewhat elaborate precautions are being taken to prevent the formation or the inhalation of dust. Mining in hard rock, particularly when dry drilling is involved, cutting and polishing granite, grinding with sandstone wheels, sand blasting and sand pulverizing, are notoriously hazardous occupations.

Making an accurate dust count with the microscopic instrument.

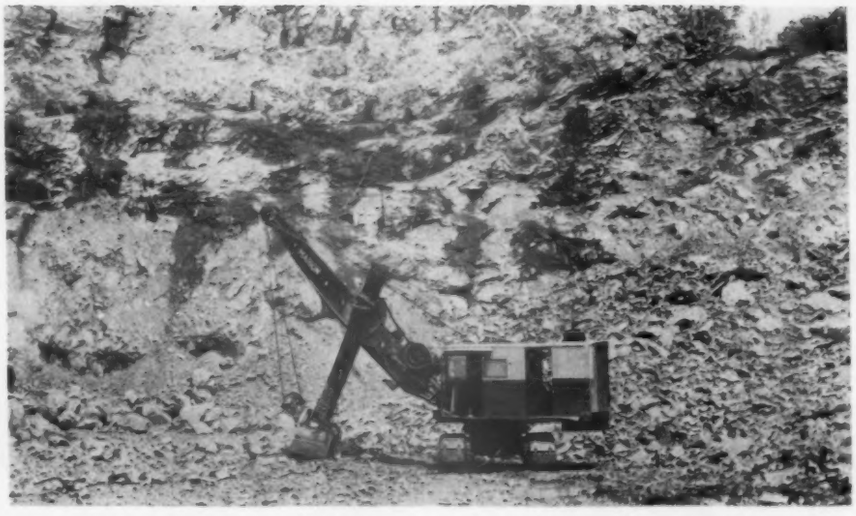
Without a definite knowledge of actual dust concentration it is impossible to work intelligently on dust control. A dust counter which will enable dust counts to be made easily and accurately without extensive laboratory training or experience by the operator has been developed. A foreman, engineer or chemist can be relied upon for accurate results. This instrument combines in one unit the necessary air-sampling device and dark-field microscope viewing and counting system, mounted on a circular base, provided with illuminating apparatus and suitably cased for transportation or storage.

In this Bausch & Lomb instrument air is drawn through a moistening chamber by means of an accurately-calibrated hand pump of .001 cu. ft. capacity. The dust particles suspended

*(Continued on page 63)*

The plant of the Vermont Production Co. viewed from waste pile. Top of quarry visible in background.

# Acquires and Improves Vermont Asbestos Plant



The new 1¾-cu. yd. electric shovel in the quarry. Note air lines and drillers on quarry face.

ACCORDING to the U. S. Bureau of Mines, the asbestos produced in the United States has in past years filled only 2 to 4 per cent. of its own requirements. The remainder has been imported from Canada, South Africa and Russia. Small quantities of amphibole asbestos are produced in several states, and some high-grade spinning asbestos is produced in Arizona. The production of short-fiber, non-spinning chrysotile asbestos in this country is confined to the state of Vermont and the demand for this material is rapidly increasing.

This growing demand was the reason for an extensive program of plant additions and improvements by the Vermont Production Co., Inc., a subsidiary of the Ruberoid Co., nationally-known manufacturers of asphalt and asbestos building products which in February, 1936, took over the plant and property of the Vermont Asbestos Corp. of America near Hyde Park, Lamoille County, Vt. These improvements also made possible the salvaging of shorter grades of fiber than heretofore. The present capacity of the operations is upwards of 100 tons of rock per hour. The productive capacity is 5 to 6 tons per hr. of all grades of raw asbestos fiber up to and including shingle fiber. The new equipment added includes a 1¾-cu.yd. Marion electric shovel with Ward-Leonard control, three 10-ton Mack trucks, a 5½-ft. Symons cone crusher, a number of Bauer Bros. Co. shaking tables, four new Chevrolet trucks with 4-ton bodies, and an Ingersoll-Rand air compressor.

Vermont asbestos is now widely used in the manufacture of asbestos cement shingles and sidings, wall-board, corrugated sheets, asbestos paper and millboard, furnace lining, air-cell pipe covering, molded brake lining and clutch facing, boiler coverings, plastic roofing cements and protective paints, insulation cement, plastic wall finishes, and various molding compounds. Nationwide distribution has been established and Vermont asbestos is exported to South America, Japan, England and Europe. During the past four years the demand has more than tripled.

Loading finished asbestos into sacks for shipment.

The asbestos deposits of the Vermont Production Co., Inc., are on the south side of Belvidere Mountain, about 17 mi. by road from Hyde Park, and comprise some 1,700 acres. This, at the present rate of production is enough to last more than a hundred years. This chrysotile asbestos occurs in serpentine rock. The overburden is removed in stone-boats drawn by horses because of the steepness of the mountainside into which the quarry is being developed.

The 150-ft. high open quarry face is being shot down in benches, drilling being done with jackhammers. Two Marion electric shovels, Models 471 and 450, load the rock into three Mack Model A C trucks with 10-ton steel rear-dump bodies. These trucks, which replaced cars and locomotives in the

The plant viewed from the quarry floor level. One of the conveyors which carries waste to piles may be seen in the background.

quarry, dump the rock into a chute feeding the Traylor 28-in. by 36-in. primary jaw crusher. This is the first unit in the plant, which is located on the mountainside below the quarry and is designed to utilize gravity to the greatest possible extent in its operation.

Conveyors carry the rock from the primary crusher to a 1,000-ton storage bin from which it is discharged into a Farrel-Bacon 13-in. by 30-in. jaw crusher. A drop-bar grizzly removes minus 3-in. rock ahead of the crusher and this joins the minus 3-in. product coming from the crusher. The rock is then split to two 4½-ft. by 40-ft. rotary driers which remove the excess moisture. A trommel with ¾-in. openings precedes a 5½-ft. Symons cone crusher which is the final reduction unit. The material passing through the trommel and the crusher product are then combined on a conveyor which takes them to a storage bin.

The first step in milling consists of running the crushed asbestos-bearing rock through a series of Jumbo fiberizers. These consist of cylindrical drums with corrugated steel linings, each having a central shaft equipped with arms having shoes on their ends. The rock is crushed against the sides of the cylinders by these shoes, and the resultant impact action largely separates the asbestos fiber from the rock matrix. The discharge from the fiberizers is passed over shaking tables to screen out the fine sand; and during this process the loosened fiber, being much lighter than the matrix material, is picked up by air suction into collectors. The oversize material passing the hoods is passed on to a second series of fiberizers to insure maximum possible recovery of fiber. The fiber picked up by air suction in the collectors is further screened, passed through dust removers and graders, dropped into bins according to length, and placed in 100-lb. bags.

The small particles of light asbestos left floating in the air of the collectors are recovered in a settling chamber. Known as "floats," these are readily marketable for use in various molding compounds where heat resistance is a factor.

Prior to this year no grades of fiber shorter than 0-0-5-11 were produced. Today the following grades are recovered: 0-2-10-4, 0-0-10-6, 0-0-8-8, 0-0-5-11, 0-0-2-14, 0-0-1-15, 0-0-0-16, no test, "floats," and special brake-lining fiber.

The waste material is carried on a series of belt-conveyors to two waste piles below the plant which are being filled up to plant level. This fill is being made in such a manner that a future storage building may be built on it.

The bags of finished fiber are transported by a fleet of four Chevrolet and three Ford trucks to the railhead at Hyde Park, Vt., to be loaded directly into cars for shipment or to be stored in reserve warehouses at Hyde Park.

The new buildings include a shorts-mill addition for the salvaging of short fiber that formerly went to the dump, a new "floats" collecting plant, and new facilities for the storage of dynamite in car-load lots. Plans of additional important items in the plant-improvement program are progressing rapidly, including one for a wet-rock storage bin of substantial capacity.

Air for quarry drilling and other purposes is supplied by a new Ingersoll-Rand Model 75 H two-stage, air-cooled compressor of 360-cu.ft. per mi. capacity. This is supplemented by two smaller compressors at the quarry level. Other equipment includes a Sullivan drill sharpener, a forge, etc. A Caterpillar tractor is used for general utility about the plant.

One of the new 10-ton trucks discharging rock to primary crusher.

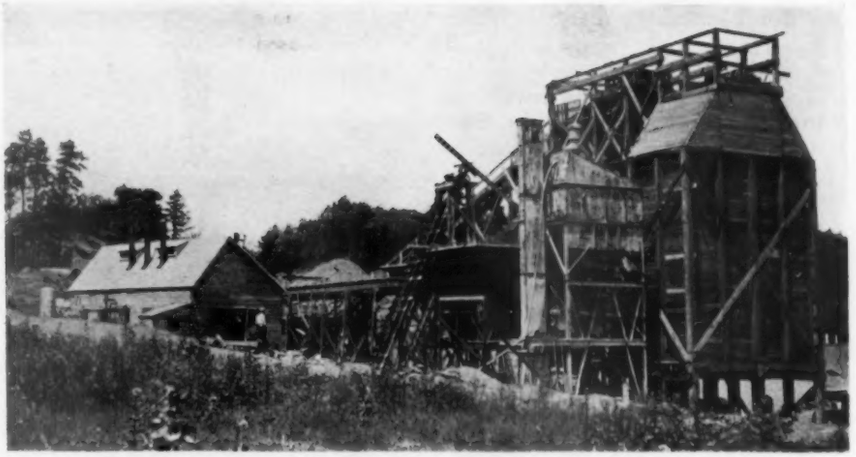
## Lime Output Higher

Lime sold or used by producers in the United States in 1935 amounted to 2,987,133 short tons valued at $21,748,655, according to figures compiled by the United States Bureau of Mines from reports furnished by lime manufacturers. This represents an increase of 25 per cent. in quantity and 27 per cent. in value compared with 1934. Sales of hydrated lime, which are included in the above totals, amounted to 1,005,619 tons valued at $7,939,513, an increase of 21 per cent. in quantity and 26 per cent. in value. The average unit value of all lime in 1935 was $7.28 a ton compared with $7.16 a ton in 1934; hydrated lime showed an increase from $7.63 a ton in 1934 to $7.90 a ton in 1935. The total number of plants that reported operations in 1935 was 301 or 23 less than in 1934, due chiefly to the nonoperation of field kilns and the closing of small plants.

Sales of lime for agricultural uses—282,660 tons valued at $1,901,839, increased 27 per cent. in quantity and 29 per cent. in value; sales for construction—656,894 tons valued at $5,716,802, increased 28 per cent. in quantity and 34 per cent. in value; sales of lime used in the manufacture of chemicals—1,592,321 tons valued at $10,344,180, increased 19 per cent. in both quantity and value. Of the total chemical lime produced in 1935, 26 per cent. (407,722 tons) was reported sold for minor and unspecified uses. Refractory lime (dead-burned dolomite) sold or used by producers in 1935 amounted to 455,258 tons valued at $3,785,834 and represented a gain of 40 per cent. in both quantity and value. Ohio, the largest producer of this product, had an output of 232,983 tons valued at $2,063,834 in 1935.

Ohio, the largest producing state (707,358 tons valued at $5,690,656 in 1935), showed an increase of 26 per cent. in quantity and 33 per cent. in value, and Pennsylvania, the second state in rank (531,501 tons valued at $3,703,339 in 1935), increased 22 per cent. in quantity and 17 per cent. in value compared with 1934.

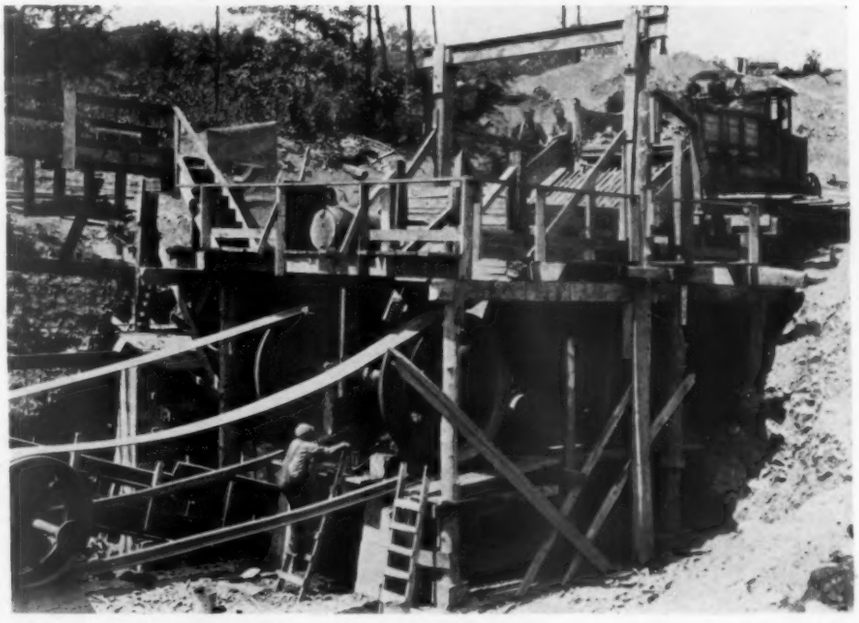
The new plant of the Arborio Road Construction Co. with power house at left.



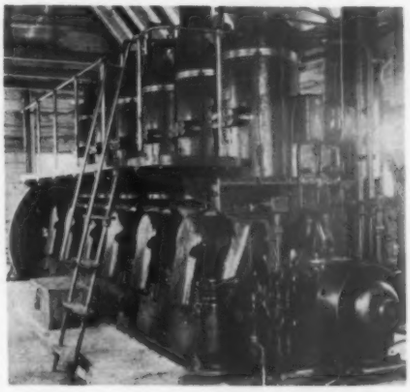
# New England Road Builder Goes into Crushed-Stone Business

COMMERCIAL producers of aggregates in the more sparsely settled sections of this country have in recent years encountered increasing competition from contractors operating portable or temporary plants to produce the materials needed for their contracts. Commercial producers in more thickly settled regions have had little if any competition of this type. Occasionally, however, a contractor in such an area will erect a permanent plant primarily to supply his own needs but in some cases will also compete with commercial producers by marketing his excess production.

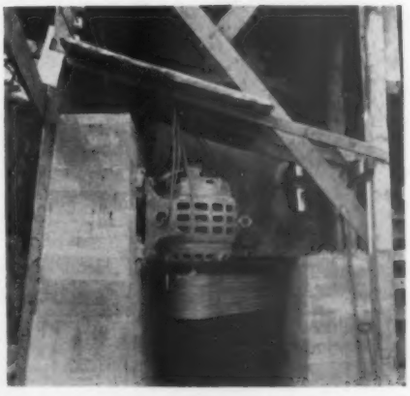
An example of this type of operation is furnished by the new crushed-stone plant of the Arborio Road Construction Co. near Hartford, Conn., which went into operation August 1, 1936. This company is one of the more important highway contractors operating in New England and for years has purchased the aggregates required. According to John Arborio, president and treasurer, the company in 1935 purchased 90,000 tons of crushed stone and the belief that this material could be produced at a lower cost with company-owned equipment was the motive behind the construction of this plant. The plant immediately began production of material for a highway contract requiring a total of 86,000 tons of crushed stone. Mr. Arborio also said that most of the work done by his company is within economical shipping distance of the plant.



Tractor truck discharging rock to primary jaw crusher. Return conveyor and secondary crusher are at left.



The 300-hp. Diesel engine and generator which supply power for entire plant.



The vertical motor and V-belt drive of gyratory secondary crusher.

The plant is located on a main highway a few miles west of Hartford. It has a capacity of about 100 tons per hr. and was designed by Mr. Arborio, who also supervised its erection. All the new equipment used in the plant, including the secondary crusher, the two vibrating screens, and the belt-conveyors, was supplied by the Kennedy-Van Saun Mfg. & Engrg. Corp. Perhaps the most interesting feature of this operation is

the Diesel-generating unit which furnishes the electricity used to drive all the plant motors.

The deposit is a trap rock which is common to this territory and passes all state and other specifications for concrete aggregate. As the quarry was just being opened at the time the writer visited the plant little can be said about quarrying methods. At present a drifter drill is being used and small toe-hole shots are made. A P&H 1½-cu.yd. shovel loads the stone into two Linn tractor-trucks of 6-yd. capacity which haul about 100 ft. to the plant. These

Looking down main conveyor at the crushers and the quarry being opened.

machines are of the rear-dump type and have gasoline engines.

At the plant the stone is dumped over sloping rails into the Acme 42-in. by 48-in. primary jaw crusher which is set at 6 in. A 30-in. belt-conveyor on 185-ft. centers carries the crusher product to the top of the plant, where it is discharged on a 4-ft. by 8-ft. Kennedy-Van Saun triple-deck vibrating screen. This screen is usually fitted with 2½-, 1½-, and 1-inch wire cloth. Stone retained on the top deck is chuted to a 24-in. by 250-ft. horizontal belt-conveyor which discharges it into a Kennedy-Van Saun S49 gyratory crusher. This crusher is usually set at 2½ in. and its product is discharged to the main belt conveyor

One of the two vibrating sizing screens with its motor and V-belt drive.

Shovel in quarry loading one of the 6-cu. yd. tractor trucks.

feeding the screen described. Any of the other sizes of stone from this screen can also be sent to the reduction crusher if desired.

The two intermediate sizes of stone produced by this first screen are chuted direct to the storage bins. The stone passing through the bottom deck is carried on a 24-in. by 30-ft. belt-conveyor to a 4-ft. by 8-ft. Kennedy-Van Saun double-deck vibrating screen which usu-

V-belt drive of the main belt-conveyor to the screening building.

ally has ¾-in. and ¼-in. wire cloth. All three sizes produced go direct to the bins, the fines or screenings being used in water-bound macadam.

The finished materials are stored in a 5-compartment wooden bin with a total capacity of 1,000 tons. Trucks are loaded underneath the bin through clam-shell gates. Alongside the main plant building are aggregate-batcher bins and a Blaw-Knox cement batcher bin for the production of dry-batched materials. All the batching for contracts held by the company is done here. When an excess of any size of material is produced, it is stock-piled by motor trucks and is later loaded into trucks by a Barber-Greene stock-pile loader. All aggregate shipments are made by motor trucks and are weighed on a Standard truck scale.

The Diesel-engine generating unit which supplies the electric power for all the plant operations is housed in a wood-frame building near the plant. The 6-cyl. Fairbanks-Morse semi-Diesel engine develops 300 hp. and is direct connected to a Fairbanks-Morse 200-kw. alternator. The exciter for the alternator and the circulating water pump for the engine are driven direct. All the other equipment units in this building and in the plant are driven by individual electric motors. The engine has a temperature indicater on each cylinder and a Brown electric exhaust-temperature indicator of the selective type. This engine with the alternator, air-compressor, switchboard, and most of the electric motors and equipment, was furnished by the Andren-Myerson Corp., Boston, Mass. The Sullivan 12-in. by 10-in. air compressor is in the engine-house and is belt-driven by a 60-hp. G. E. motor.

The Diesel generator is at present operating electric motors with a total load of about 225 hp. The main, screen and return belt-conveyors are driven through Gates Vulco-Rope drives by 25-, 1-, and 3-hp. G. E. motors, respectively. The two vibrating screens are driven through Goodyear V-belt drives by 7½- and 5-hp. motors, respectively. The primary jaw crusher is driven by a 150-hp. G. E. motor which drives a shaft by a flat belt. Two pulleys on this shaft drive the two drive wheels of the crusher by belt. Goodrich "Highflex" composition belts with Plylock belt joints are used. The gyratory reduction crusher is driven through Gates Vulco-Rope by a 100-hp. motor.

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## 1936 Book of Standards Is Issued by A.S.T.M.

The American Society for Testing Materials has just issued its 1936 Book of A.S.T.M. Standards. This triennial publication contains all the standard specifications, methods of test, recommended practices and definitions formally adopted by the Society. The 1936 issue is in two parts—Part I giving in their latest form all A.S.T.M. standards covering metallic materials; Part II, all standards relating to non-metallic materials. Both parts aggregate 2400 pages.

In each part, the specifications for a particular class of material are given first, followed directly by the test methods, definitions, etc. A complete subject index lists each standard under the principal subject covered, with the keywords in alphabetical sequence. This index, together with two tables of contents, one listing standards by the materials covered, the other in order of sequence of the serial designations, facilitates the use of the book.

By THEODORE C. WATERS
Mullikin, Stockbridge & Waters, Baltimore, Md.

# What Employers Should Know About Silicosis*

PRIOR to the adoption of the workmen's compensation acts by our several state legislatures an employee injured in the course of his employment could only recover from his employer for those injuries which could be attributed to the negligence of his employer.

While liable for his own negligence, the employer was not liable for the dangers of the employment, a risk that was assumed by the employee. The contributory negligence of the employee and the negligence of his own fellow servants were similarly available as defenses to the employer. Therefore, in cases involving industrial disputes, as a result of this legal status, employees resorted to actions at common law to obtain compensation for injuries based upon the alleged negligence of the employer.

*Objects of Compensation Acts.*—The main purpose of the authors of the workmen's compensation acts enacted by our several state legislatures was to make the remedy granted thereby the exclusive remedy for injuries suffered by employees during the course of their employment. These acts stripped the employer of his common-law defenses, including:

1. Failure to prove the employer's negligence.
2. Assumption of risk by the employer.
3. Contributory negligence of the employee and negligence of his fellow servants.

In other words, the compensation acts made the employers insurers of the safety of their employees against accidental injuries. On the other hand, the compensation acts deprived the employee of his right of common-law action for accidental injuries sustained by him in the course of his employment. We must bear in mind, however, that the workmen's compensation acts did not purport to cover occupational-disease injuries, but solely accidental injuries, that is, those injuries which occurred at a specific place at a certain time, and which could be ascertained and determined coincidentally with the infliction of the injury.

Forty-six states and the District of Columbia have enacted workmen's compensation acts; Arkansas and Mississippi alone not having such acts at the present time. Compensation acts which exclude compensation for occupational diseases, either expressly or by judicial interpretation, have been enacted in thirty-two states. Fourteen states and the District of Columbia have (a) workmen's compensation acts which include compensation for occupational diseases, either expressly or by judicial interpretation, or (b) specific occupational-disease acts.

With respect to those courts holding that the workmen's compensation acts do not provide an exclusive remedy to an employee, whereby the employee retains his common-law right of action for injuries sustained by him in the course of his employment, such ruling is based substantially upon the reason that since workmen's compensation acts were designed primarily to compensate for traumatic injuries, they replace the employer's common-law liability solely for those injuries sustained by accidental means.

Therefore with respect to those personal injuries sustained by other means, as for example, silicosis, since it is not compensable under the compensation acts, the employee still retains his common-law right of action therefor based upon the negligence of his employer. With respect to those courts holding that the workmen's compensation acts do provide exclusive remedy, such ruling is based primarily upon the language of the act and the further ruling that an employee had no common-law right of action for occupational-disease injury.

*Legal Basis for Recovery.*—The usual form of declaration contains allegations that the defendant manufacturer caused the plaintiff to work in an atmosphere where silica dust existed; that the defendant knew or should have known that certain materials used by the defendant employer contained harmful or dangerous agencies of silica which were destructive to life and health in the human body; that the defendant was guilty of negligence in failing to warn the plaintiff of the danger and in failing to provide the plaintiff with a safe place in which to work or safe appliances with which to work; that thereby the silica became introduced into the plaintiff's lungs and body, causing him permanent injury.

The defense pleadings set up the defense of assumption of risk by the plaintiff, the plaintiff's contributory negligence, the negligence of the plaintiff's fellow servants and a general denial of the allegations of negligence as charged by the plaintiff.

It is needless for me to emphasize the seriousness of this type of litigation. Class is arrayed against class. The local press in those places where the causes are tried will carry sensational headlines with respect to the trial, describing the terror of the disease and emphasizing each complaint against the manufacturer. Suits are filed, not singly, but by the dozens. The whole community

*Presented at the 1936 National Safety Congress.

**"On previous occasions we have said that the prevention of suits for alleged silicosis damage is more a matter of mechanics than of legislation—for some have sought the passage of laws relieving the employer from liability in silicosis cases. The installation of modern dust-collecting equipment, of which there are numerous efficient examples on the market, is the most effective means of stopping the growing number of silicosis damage suits. The use of such appliances reduces the exposure hazards, not perhaps to the minimum (which is a term of perfection and therefore unattainable), but at least to the point where it becomes extremely difficult, if not almost impossible, for a worker to contract the disease. In the few cases where the disease may develop, the employer when sued can point to his equipment as evidence of his desire to prevent, as far as technological development has made possible, the contraction of the disease by his employees. No more formidable disproof of alleged contributory negligence on his part could be set up; certainly there could be no more effective evidence of his interest in his employees' welfare for presentation to a jury."—From an editorial, PIT and QUARRY, March, 1935.**

wherein the industrial plant is located becomes aroused, with the attendant industrial chaos, and by the time trial day arrives every citizen of the community is so prejudiced against the defendant that it is almost impossible to procure an impartial trial.

*Need for Compensation Legislation.*—The ultimate solution of the problem of compensation for silicosis must be found in some type of legislation that will remove this dispute from the field of common-law suits. In the same way that workmen's compensation acts eliminated such actions for accidental injuries, some legislation must be devised to eliminate such actions for occupational-disease injuries.

The honest employer desires to provide compensation for those injuries occurring to his employees as a result of the industrial processes in which the employee is engaged and which are peculiar thereto. The honest employee similarly desires compensation only when he has suffered actual injury. . . .

In the first place the nation-wide publicity that has been given to this problem has served a fortunate purpose in molding public opinion to eliminate such diseases from industry so far as engineering control thereof is capable of doing so. You and I as citizens recognize the fact that industry should provide for its employees a safe place in which to work, and accept this obligation imposed upon us by law.

In the second place the problem itself is one that calls for the coöperative effort of both capital and labor. There are certain industrial processes wherein the hazard of silicosis exists, and to-day there are available mechanical improvements to eliminate or control this hazard. Upon capital rests the burden of the installation of such mechanical equipment as will minimize the hazard in so far as is possible. An affirmative duty of constant care is imposed upon industry to perfect its mechanical improvements for control. However, for their part, those who labor must be educated in the ways and means of protection, to carry out the principles of good housekeeping that employers and responsible state agencies may suggest, and utilize such protective appliances that may be offered for their protection.

If employers and employees alike recognize and discharge these duties, effective results should be obtained in minimizing the hazard and controlling diseases arising therefrom. Again, with respect to compensatory legislation, occupational-disease compensation should not be allowed to become health insurance, and upon industry should be imposed only those costs which compensate injuries that are peculiar to the particular industries in which the employees are engaged.

*Form of Silicosis Compensation Acts.*—For many who have given but superficial thought to this problem, it has been somewhat easy to say that compensation for silicosis injuries should take form similar to that for accidental injuries. The vice of such thought is in our failure to recognize the essential differences between the two types of injuries, to wit, that accidents occur at a specific time, at a specific place, in a specific way, under a specific employer, while silicosis and other occupational-disease injuries are the result of the accumulation of injurious substances over an extended period of time in different forms or types of employment and even under different employers.

Therefore, the practical administration of the thought to compensate silicosis injuries in a manner similar to accidental injuries has not proved satisfactory and some other solution must be found.

We have seen that in considering the national development of compensation acts, their original design was to cover only accidental injuries; in form and in methods of administration they were not designed to cover occupational diseases. It may be true that certain occupational diseases have characteristics strikingly similar to traumatic injuries, such as anthrax and lead poisoning, where the disease develops immediately after exposure and the development of the disease is rapid and becomes disabling, fatal or cured within a limited period of time.

On the other hand, there are certain forms of occupational diseases, for example, silicosis, where the injuries sustained represent the accumulation of injurious substances over an extended period of time and disablement may follow exposure to hazards under successive employers. Therefore, in considering legislation for occupational diseases, we must recognize the fact that the problem with which we propose to deal is, of necessity, different from the accidental-injury problem and that the administrative provisions of such legislation must be designed especially to handle this particular problem.

I am not a professional critic of workmen's compensation laws in effect in this country, but one thing is certain, none of them is perfect. Some of their provisions are perhaps unjust, either to the employer or the employee and certainly in the administration of these provisions the human element therein may give rise to certain inequities. However, these acts were the result of the need of transferring the disputes arising between employer and employee to some state agency whereby they might be settled, other than that provided by our courts of law. From my own observation of silicosis litigation I believe that from the standpoint of the employer, the employee, and the public some agency other than our courts of law should be established to determine the liability of employers for occupational-disease injuries sustained by their employees.

I have mentioned the possible inequities that have existed under our compensation acts and in the administration of their provisions. However, I believe to-day it is fair to state that any attempt to effect the repeal of those compensation acts would meet with the combined resistance of employer and employee alike. Neither interest would desire to transfer back to our courts administering common law the question of the legal liability of employers for accidental injuries sustained by employees in the course of their employment.

Therefore, in view of the past administration of our compensation laws, unsatisfactory to certain interests as they may have been, it is not unreasonable to hope that intelligent occupational-disease legislation may similarly meet with the approval of employer and employee alike. Furthermore, it is reasonable to hope that such legislation may eliminate the possibility of expensive litigation that may arise and serve the social needs of all parties interested in this problem.

The statutes providing compensation for silicosis injuries that have been heretofore adopted in several of the states vary both as to form and as to provisions for their administration. In my judgment uniformity of legislation is not only impossible of achievement but distinctly inadvisable. Industrial conditions vary greatly in the different sections of the country and what may be the answer to the problem in the state of New York may be entirely separate and distinct from the answer to the problem in California. Any legislation proposed to be adopted must be suitable to the particular working conditions in the particular state in which it is to be applicable. A frank recognition of this fact will eliminate unnecessary contention with respect to such proposed legislation.

Again, some of our friends who purport to speak for labor have been advocates of the so-called "all-inclusive" occupational-disease acts. In my judgment the "all-inclusive" occupational-disease acts tend inevitably to health insurance and enable the department charged with the administration thereof to award compensation to all the human ills that may occur to employees in the course of their employment.

Another phase of the problem of silicosis-compensation legislation is that of accrued liability. In most instances where silicosis is found to exist the employees have accumulated the injurious substances that cause their condition during the term of their employment before such proposed legislation could become effective. With respect to that liability, I believe it is inequitable to saddle the expense thereof upon industry at one given time and some method should be found for apportioning this accrued liability.

Another most important element to be considered in the drafting of silicosis-compensation legislation should be a provision for the appointment of a competent medical board. Neither lawyers nor laymen are in the position to pass upon medical questions nor to determine the existence of occupational diseases in industry nor the disabling effect thereof. The determination of such injuries must be taken from lay juries and from commissions incompetent to determine such medical questions.

*Necessity of Prevention.*—I wish to emphasize what to me seems to be the most important aspect of this problem, namely, prevention. From the standpoint of those who labor they should be far more interested in the maintenance of their health in their particular employment than in compensation for injuries to that health. From the standpoint of employers the cost of prevention of occupational-disease injuries will be but a small fraction of the ultimate cost of compensation for such injuries.

With respect to silicosis through agencies such as the National Safety Council, the United States Public Health Service and other state and industrial organizations in which industry may have confidence there is available to you as employers scientific information as to methods of eliminating most of the silica hazard that exists in your particular industries. If for none other than selfish reasons, you as employers should make use of this information. The initial cost may seem great, but it will many times repay the cost of compensation for silicosis injuries.

I do not believe that modern society will countenance the continued failure of many industries to utilize such available methods of engineering control as will tend to minimize the hazard and I hope that in your industrial processes each of you here assembled will renew your interest and activities with respect to your own important departments of industrial hygiene.

Labor for its part must discharge its duties with full appreciation of the hazards that are present in the particular industries wherein its members are engaged. There must be no half-hearted use of protective appliances with which labor may be supplied. Similarly, there must be no half-hearted enforcement of factory rules and regulations with respect to the use of such appliances. Again, there must be a coöperative observance of rules and regulations that may be laid down by safety engineers or state officials with respect to health conditions in your plants.

The problem of health must become a major consideration by all interests involved and I honestly believe that with full coöperation by employer and employee alike, industry may be well on its way to elimination of this hazard and may relegate the problem of compensation for such injuries to such statutory provisions as the state may see fit to adopt, reasonable in their provisions, but unnecessary to enforce because of the previous elimination of the hazard.

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## Dust Concentration

*(from page 56)*

in the air are impinged on a circular glass plate within the instrument. The dust deposit is in the form of a ribbon. Twelve samples may be collected on one slide. These samples may be viewed and counted at once without removal and they may be preserved for future reference by simply sealing a cover glass to the slide. The viewing and counting apparatus consists of a built-in compound microscope of 200 magnification with a special dark-field illuminating system. The special hyper-plane eyepiece contains a micrometer disk ruled in 30-micron squares. An extra line, ruled next the squares, allows the approximate measurement of particles for classification as to size. The apparatus is so calibrated that by multiplying the number of dust particles in the square fields by 100,000 the total dust count per cubic foot is secured.

The unit of dust measurements is the micron, one twenty-five thousandth of an inch. According to Dr. Robert Hunt, experimentation has proved that dust greater than 10 microns in diameter is practically harmless as far as the lungs are concerned, but the maximum amount of lung pathology may be expected from dust averaging between 2 and 5 microns. Such microscopic dust is invisible to the naked eye.

"It is my opinion," continues Dr. Hunt, "that dust counts are essential in the prevention of silicosis. A dust count is a good indicator of the efficiency of a dust eliminator and is important in indicating a potentially hazardous atmosphere, but is of no consequence after the disease has manifested itself. It is very important to know the size of the dust particles, which is determined by microscopic examination." In this respect it is interesting to note that Gardner has shown that the injection of quartz particles 1 to 3 microns in diameter will produce a nodular silicotic fibrosis, although in the same period of time particles from 6 to 12 microns in diameter produce only a foreign-body reaction. This is probably due, says Irwin, to the fact that the larger particles dissolve so slowly that the dissolved silica is diluted and carried away by the lymph and blood fast enough to prevent the formation of toxic concentrations.

Dust control is important in mines, quarries, rock excavation (including abrasive wheels, abrasive paper or cloth manufacturing, emery works and hone manufacturing), asbestos goods manufacturing, brick or clay products manufacturing, (terra cotta, earthenware, tile, potteries and refractory products), cement manufacturing, phosphate works, flint, spar and silica grinding, glass manufacturing, pigment grinding, all operations using talc for dusting, stone cutting and polishing, prepared-roofing manufacturing, slate milling, abrasive soap; spar milling, and sand-blasting.


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Foley & Beardsley stabilized-mix plant with ingredient hoppers in foreground.

Loading bin where the finished mixture is taken by trucks to the road jobs.

The pug-mill which mixes the materials. Water tank is seen at the upper right.

# Supplies Stabilized Mix for 4½ Miles of Streets on Michigan FHA Project

SINCE its installation in May of this year the stabilization plant of Foley & Beardslee at Clarkston, Mich., has been in almost constant operation, producing stabilized soil-aggregate mixture.

A Federal Housing Administration development at Commerce, Mich., furnished Foley & Beardslee with a contract to supply stabilized material for 4½ mi. of streets. The streets were built with a compacted depth of 4 in. (6 in. loose) and the F.H.A. authorities were so well pleased with results obtained that it was decided to place a 2-in. compacted (4-in. loose) mat of the same material on the residential driveways in the development.

Oakland County, in which Foley & Beardslee's plant is located, is also engaged in an extensive stabilization program and has awarded several good-sized contracts for stabilized mixture to this producer. The use of stabilization for private driveways has brought Foley & Beardslee orders from individuals for their plant-mixed material.

Like most producers, Foley & Beardslee had on hand much of the equipment needed to construct a stabilization plant—hoppers, conveyor belts, loading bin, etc.—so their actual outlay of money was not excessive. The only new equipment purchased was a pug-mill and a screen.

Tests revealed that the strippings from the gravel pit contained suitable sand-clay binder soil and that a properly-proportioned stabilized mix, with a plasticity index of 7, could be obtained by combining 32 per cent. of this material with 8 per cent. of heavy clay and 60 per cent. of pea gravel, by weight. The heavy clay is composed of settlings taken from the end of the flume at the gravel plant.

The sand-clay, pea gravel and heavy clay are mixed with a crane in proper proportions before they reach the stabilization plant. There the material is dumped and shoveled into a 5-cu.yd. bin located directly over a belt-conveyor which carries it to the pug-mill. A calcium-chloride hopper feeds the chemical to the belt at the rate of 12 lb. to the cu.yd. before the mix reaches the pug-mill.

In the pug-mill, which is 12 ft. long, 3 ft. deep, and is driven by a 25-hp. motor, the materials are thoroughly mixed and water is added in an amount sufficient to produce ready compaction when spread. A belt-conveyor, driven by a 10-hp. motor, carries the finished mixture to an 80-ton loading hopper, where it is dumped into trucks for delivery to the road. The plant has a capacity of 350 to 400 cu.yd. of stabilized material per day.

In addition to this stabilized mixture, Foley & Beardslee use the plant for the production of material under Michigan State Highway Specifications No. 21-A. This material, with larger aggregate, includes gravel, binder-soil, and calcium chloride, and is used by the state as base course for oil-aggregate surfacing.

Thomas J. Foley, president of Foley & Beardslee, has much confidence in the future of plant-mixed stabilized materials and believes that this new market for aggregate producers will be of steadily-increasing importance to the industry.

# MEN of the INDUSTRY

**BEN W. CALVIN**

Since Aug. 1, 1936, vice-president and general manager of the Aetna Portland Cement Co., Detroit, Mich., Mr. Calvin has had an interesting and varied career. A native of Topeka, Kan., he served in the air service during the war and was mustered out in 1919. After a few years in the lumber business in the South he became a salesman for the Universal Portland Cement Co., at Chicago, Ill., leaving after two years to manage builders'-supply businesses in Louisville, Ky., and Detroit, Mich. His next position was that of sales manager at Jackson, Mich., for the Consolidated Cement Corp., where he remained for nine years until he accepted his present post. Mr. Calvin is 40 years old and lives at Birmingham, Mich.

# Personal Mention

HERBERT M. CROSS has been made New York district sales manager, JOSEPH G. McCABE, JR., Philadelphia district sales manager, and IRA F. HONAMAN, assistant to Mr. McCabe, by Pennsylvania-Dixie Cement Corp. Since Aug. 1, Mr. Cross had been acting as district sales manager at Philadelphia and for several years previously had been assistant manager of the New York district. Mr. McCabe had been assistant manager at the Philadelphia office while Mr. Honaman has been a Philadelphia salesman since June, 1929.

DAVID S. YOUNGHOLM, has been elected vice-president of the Westinghouse Electric & Mfg. Co. He will make his headquarters in New York.

W. W. WILLIAMS, formerly general sales manager, has been made general manager of the Babcock & Wilcox Tube Co., Beaver Falls, Pa. T. F. THORNTON, formerly sales manager of the Detroit district, has been promoted to general sales manager.

HARRY BUCKENHEU, who has long been associated with the sale of equipment in the crushed-materials industry, is now associated with the New York office of the Nordberg Mfg. Co., with headquarters at Wilmington, Del. His Wilmington address is 2901 Harrison St.

J. S. ALLISON, JR. has been named by the Babcock & Wilcox Co. as Chicago district manager of its refractories-sales department, 140 S. Dearborn St. He will be assisted by H. J. Shaner and R. M. Onan, who have been handling the sale of refractories in the Chicago district for several years. Mr. Allison was formerly manager of the high-temperature insulation department, building-products division, of Armstrong Cork Products Co.

H. F. CLEMMER, engineer of materials, District of Columbia, representing A.S.T.M. Committee C-9 on "Concrete and Concrete Aggregates," and FRED HUBBARD, consulting engineer, Standard Slag Co., Youngstown, O., representing A.S.T.M. Committee D-4 on "Road and Paving Materials," have been named members of the Society's standing committee on "Simplified Practice Recommendation for Coarse Aggregate."

WARREN H. LEONARD, formerly sales manager, has been made general manager of the Riverside Cement Co., Los Angeles, Cal. Other promotions include the elevation of JOHN C. ALLEN to sales manager. He was formerly assistant sales manager, which position is to be filled by HOLTON C. DICKSON.

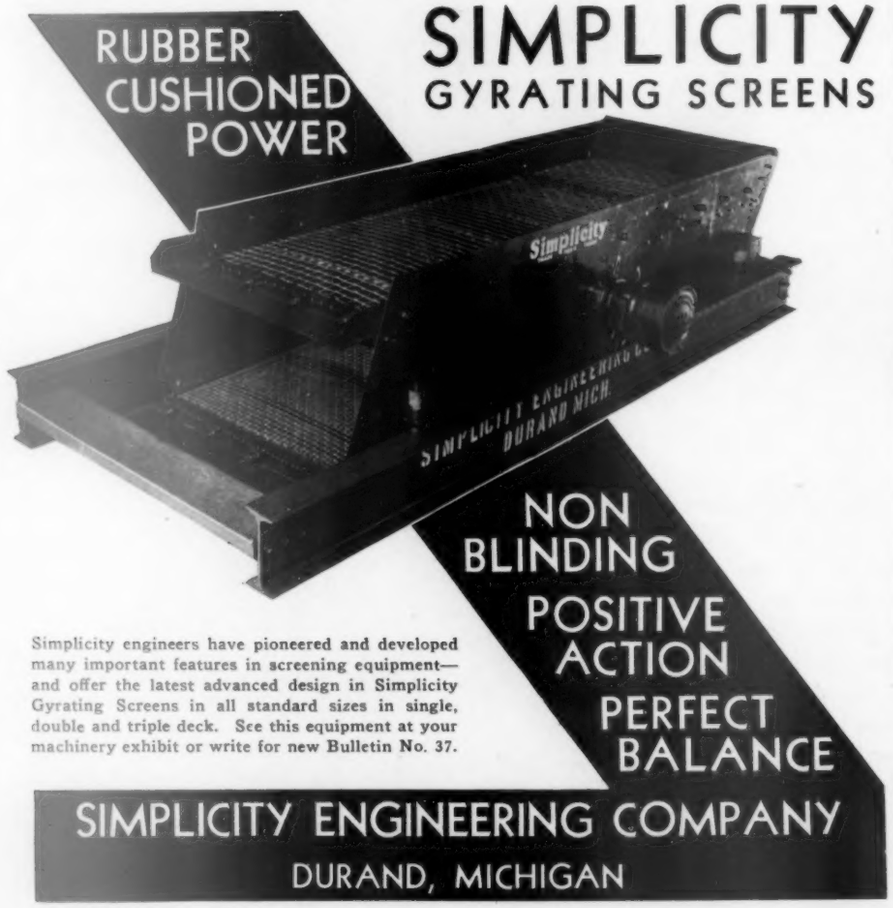
GEORGE WEISENBERG, a machinist at the Pacific, Mo., plant of the Missouri-Illinois Gravel Co., suffered the loss of his left forearm recently when it became caught in some machinery at the plant.

E. T. SLACKFORD has been named advertising manager by the Harnischfeger Corp., Milwaukee, Wis. A graduate of Ohio State University, Mr. Slackford has spent more than 10 years in industrial engineering and sales promotion work, both with manufacturers and advertising agencies.

C. A. BUXTON, formerly general service manager of the Cummins Engine Co., Columbus, Ind., has been made assistant to Paris E. Letsinger, vice-president in charge of sales. For the past twelve years Mr. Buxton has been with the Cummins organization, in the capacity of works manager, purchasing agent, and more recently general service manager. Succeeding Mr. Buxton in the position of general service manager is DAVE S. CRAVEN, until recently of San Francisco. Mr. Letsinger also announces the sub-division of the United States into four regions with four district managers in charge. In the eastern region is DELOSS C. CUMMINS, with headquarters in New York; in the southern region is JEROME C. CHAMBERS, Ft. Worth; in the central region is A. E. LEBLANC, Chicago; and in the west DAVE BUTTLES with headquarters in Fresno.

C. A. Buxton

D. S. Craven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W. H. Atkinson, who was chemical engineer of the Asbestos Manufacturing Co., Huntington, Ind., is now assistant superintendent in charge of materials and processing.

Max Jahnke, formerly superintendent of the Algonquin, Ill., sand-and-gravel plant of the Moulding-Brownell Co. of Chicago, has purchased the Lake Geneva Sand & Gravel Co., Fontana, Wis., and will operate after remodeling.

W. B. Cabaniss has been named plant superintendent by the Signal Mountain Portland Cement Co., Chattanooga, Tenn., succeeding S. Rordan who is now in charge of the research laboratory of the Trinity Portland Cement Co., Houston, Tex.

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L. P. Dillon, 63, president of the James River Hydrate & Supply Co., Indian Rock, Va., passed away Nov. 3.

John S. McMillin, president of the Roche Harbor Lime & Cement Co., Roche Harbor, Wash., died recently. He was a native of Sugar Grove, Ind., a graduate of Depauw University and national grand consul of Sigma Chi fraternity.

Sidney P. Armsby, well known in market research in the lime industry and formerly associated with the Haden Lime Co., Houston, Tex., died recently at Cumberland, Md.

Dan R. Long, New York district sales manager for the Pennsylvania-Dixie Cement Corp., died suddenly on Nov. 3 of a heart attack. For more than twenty-five years he had been a prominent figure in the cement industry and widely known in the cities and surrounding territories of St. Paul, Minneapolis, Chicago, St. Louis, Kansas City and Birmingham.

Ralph P. Wilton, president of Steacy & Wilton Co., lime producers of Wrightsville, Pa., died Nov. 13. For many years up to the time of his death he was treasurer of the National Lime Assn.

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The Brooks-Taylor Co. has just closed an agreement with the Chicago Bridge & Iron Co., giving that company the exclusive rights to manufacture and sell lime-putty plants to those securing the license rights from the Brooks-Taylor Co. to operate such plants. The plants will be fabricated at the Birmingham, Ala., plant of the Chicago Bridge & Iron Works, where personal supervision of all details of operation will be looked after by Hayden Brooks.

## TRADE NOTES

The Harrington & King Perforated Metals Co., Chicago, Ill., recently accepted an invitation to become a member of the Rice Leaders of the World Assn., according to J. M. Fuller, president.

Founded nearly a quarter of a century ago, the Rice organization is based on the principles of honor, quality, strength and service and has admitted from time to time those industrial concerns whose business character had made them eligible to such membership. These qualifications include a recognized reputation for fair and honorable business dealings; an honest product truthfully represented; a responsible and substantial financial standing; and a recognized reputation for conducting business in a prompt and efficient manner.

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The Union Wire Rope Corp., Kansas City, Mo., has appointed the Wendrick Steel Products Co. as its distributor in Illinois, Wisconsin and northern Indiana, with offices at 53 West Jackson Blvd., Chicago.

The company also recently named J. Melvin Moore as its Denver distributor. Mr. Moore is located at 1035 National Bank Bldg., while in New Orleans the Mechanical Equipment Corp., Howard Ave. and Carondelet St., will represent the firm.

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Water-power turbines for installation at Bonneville Dam on the Columbia River, near Portland, Ore., are being manufactured by the S. Morgan Smith Co., York, Pa. The turbines are said to be the largest of their type ever built in the United States, measuring 48½ ft. from the bottom of the runner deflector to the generator coupling. The shafts are 39 in. in diameter.


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# Traffic News Digest

## Recent I. C. C. Decisions

*Crushed Stone*—In response to fourth-section application No. 16,372, the Commission has authorized the Pennsylvania Railroad to establish and maintain a rate on crushed stone and crushed stone screenings from Buffalo, N. Y., to Kane, Pa., over the route through Corry and Warren, Pa., of $1.10 a net ton without observing the long-and-short haul clause of Section 4. I. C. C. FSO No. 12,545.

*Ground Limestone*—Fourth-section relief on ground or pulverized limestone and limestone dust has been granted the Southern and N. C. & St. L. in response to fourth-section application No. 16,362. They have been authorized to establish a rate of $1.76 a net ton on these commodities from Mascot, Tenn., to Nashville, Tenn., *via* an interstate route to meet the competition of an intrastate route between the same points without observing the long-and-short haul clause of section 4 subject to the condition that the present rates from, to and between higher rated intermediate points are not to be increased. I. C. C. FSO No. 12,544.

*Sand*—In a number of cases involving reparation on sand which were grouped in one decision and which involved rates on silica sand from Ottawa, Ill., to Cleveland, O., Elmira, Poughkeepsie, N. Y., and Westfield, Mass.; from Hancock, West Va., to Baltimore, Md.; and from Mapleton, Pa., to Newark, O., and on molding sand from points in the Albany, N. Y., district to Port Chester, N. Y., Westfield and Boston, Mass., Nashua, N. H., and Biddeford, Me., and on silica and molding sand from points in N. J. to Manlius, N. J., Branford, Conn., and Boston, Mass., the Commission has found some of the rates unreasonable and awarded reparation and have found other rates not shown to be unreasonable. Rates in effect since July 1, 1935, under attack in Docket No. 27,201 and 27,265 have been found not unreasonable. A similar decision was reached on the rates assailed in No. 27,273. In the other cases the Commission has awarded reparation to bases of rates prescribed in appendix H of Industrial Sand Cases, 1930, reported in 188 I. C. C. 99. I. C. C. Docket No. 27,201, Swindell Bros., Inc., *v.* B. & O.; No. 27,222, Shenango Pottery Co. *v.* B. & O. *et al.*, No. 27,233, National Bronze & Aluminum Foundry Co. *v.* C. B. & Q. *et al.*; No. 27,233 (Sub No. 1), Same *v.* C. R. I. & P. *et al.*; No. 27,233 (Sub No. 2), Same *v.* C. R. I. & P. *et al.*; No. 27,263, Cleveland Twist Drill Co. *v.* C. B. & Q. *et al.*; No. 27,265, A. H. Heisey & Co. *v.* C. B. & Q. *et al.*; No. 27,273, S. Cheney & Son *v.* N. Y. C. *et al.*; No. 27,278, Mechanics Iron Foundry Co *v.* Pennsylvania *et al.*; No. 27,278 (Sub No. 1), Nutmeg Crucible Steel Co. *v.* Pennsylvania *et al.*; No. 27,280, Eclipse Machine Co. *v.* C. R. I. & P. *et al.*; No. 27,287, Empire Foundry Co., Inc., *v.* D. & H. *et al.*; No. 27,296, Federal Bearings Co., Inc., *v.* C. R. I. & P. *et al.*; No 27,299, H B. Smith Co. *v.* Boston & Maine *et al.*; and No. 27,300, Saco-Lowell Shops *et al. v.* Boston & Maine.

*Emergency Surcharges*—While not affecting the non-metallic minerals industry generally, an interesting decision was recently rendered bringing out very clearly the elements necessary to prove that a violation of section 13 exists. In this case the North Carolina Commission would not allow the railroads in that state to assess emergency surcharges after July 1, 1936. The Principal railroads in North Carolina petitioned the Interstate Commerce Commission to find that this resulted in undue prejudice or preference as between persons or localities in intrastate commerce on the one hand and interstate commerce on the other and that it received undue, unreasonable and unjust discrimination against interstate commerce. At the hearing no shipper appeared in support of the allegation of undue prejudice as between persons or localities and evidence was not submitted which proved that such undue prejudice or preference existed. The report states that a mere difference between particular rates on interstate and state traffic is not sufficient to prove that such difference in rates results in discrimination against interstate commerce. Figures presented by the railroads with the intention of proving that the loss of the emergency charges on the North Carolina intrastate traffic resulted in unjust discrimination against interstate commerce were based on an estimated amount of traffic and the figures generally were based on assumptions and estimates which could not be verified. Finding nothing unlawful in the action of the North Carolina Commission the proceeding has been discontinued. I. C. C. Docket No. 27,463, emergency charges within North Carolina.

*Pick-up and Delivery Service*—The decision of the Commission in the cases involving pick-up and delivery service in official territory was rendered just as the November issue of PIT AND QUARRY was going to press and a digest of the report was not possible although the result of the decision was published. In this case the Commission decided that pick-up and delivery service was subject to part I of the Interstate Commerce Act and that a rate as low as 30 c. per 100 lb. is not high enough to warrant free pick-up and delivery with an allowance of 5 c. per 100 lb. to such shippers and receivers of freight as perform the pick-up and delivery service themselves. The Commission found, however, that such a service and allowance was justified when the rate was 45 c. per 100 lb. or higher. There was some question as to whether this service might not be subject to part II of the Interstate Commerce Act which deals with motor carriers, Commissioner Lee taking the view that part II is involved. Other members of the Commission, including Commissioner Eastman, who is chairman of the division having administrative charge of the motor carrier act, agreed that only the first part of the Interstate Commerce Act was involved in this case. In a separate opinion by Commissioner Eastman concurred in by Commissioner Caskie, pointed out that he believes the pick-up and delivery service should be published as an extra or plus charge to be added to the station-to-station rates when such service is desired and points to this service as proposed by the rail carriers as an unfair or destructive competitive practice. He agreed with many of the truck men who were protestants in the case that many of the proposed rates were not compensatory. At the hearing, protesting truck men claimed that the proposed tariffs would disrupt the class rate adjustment prescribed in Eastern Class Rate Investigation 164 I. C. C. 314 but the report points out that the rates prescribed in that case were maximum rates and that the carriers were free to publish lower rates if they desired. In commenting on whether this service came under the rail section or the motor carrier section of the Interstate Commerce Act the report says in part "the term 'common carrier by motor vehicle' is defined in section 203 (a) (14) as meaning:

"Any person who or which undertakes, whether directly or by a lease or any other arrangement, to transport passengers or property, or any class or classes of property, for the general public in interstate or foreign commerce by motor vehicle for compensation, whether over regular or irregular routes, including such motor vehicle operations of carriers by rail or water, and of express or forwarding companies, except to the extent that these operations are subject to the provisions of part I."

In the foregoing language there is clearly expressed an intention to exclude the motor-vehicle operations of rail carriers from the definition of a common carrier by motor vehicle to the extent that these operations are subject to the provisions of the interstate commerce act. In making this exception Congress may be presumed to have legislated with knowledge of the court decisions previously mentioned, holding that pick-up and delivery service is within the meaning of "transportation" as defined in section 1 (3), of the interstate commerce act, as well as with knowledge of our own administrative finding to the effect that, while railroad terminal service by motortruck was subject to regulation under the interstate commerce act, the use of motor trucks by railroads in line-haul service was not subject to that act. United States *v.* Bailey, 9 Peters 238,255; National Lead Co. *v.* United States, 252 U.S. 140,147."

Other important parts of the report stress the fact that it is not necessary for rail carriers to constitute themselves as common carriers by motor vehicle in order to provide pick-up and delivery service. Shippers' testimony in these proceedings show that there has been no diminution in the shippers' strong desire for the service and that there can be little question that the service must be supplied if the railroads are to retain their present shrunken volume of less-than-carlot tonnage. The continued reductions in this tonnage which would be likely without pick-up and delivery service


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could only have the effect of increasing the cost on the small amounts of less-than-carload traffic which would eventually remain on the rails. The report points out that the Commission may properly exercise its minimum-rate power but it appears here that substantially without exception that truck rates are the same as or lower than the rail rates which would be applicable under respondents' proposal. In commenting on the lawfulness of an allowance for pick-up and delivery service the report states that the allowance is lawful provided it is made available to all owners of property transported, furnishing like instrumentalities or performing like services in connection with the transportation of their traffic. I. C. C. Docket I. and S. No. 4,191, pick-up and delivery in official territory and No. 27,425, official territory pick-up and delivery service.

## Examiners' Reports

*Sand and Gravel*—Examiner John Davey recommends an award of reparation of $32.46 with interest on finding that the rate on sand and gravel from Hawarden, Ia., to Parker, S. D., of 75 c. was, is and will be unreasonable to the extent it exceeded, exceeds or may exceed 70 c.

*Railroad Control of Motor Carriers*—Examiner Robert R. Hendon proposes that the Commission approve the application of the Union Pacific Railroad Co., Chicago, Burlington & Quincy Railroad Co., and Charles P. Megan, trustee of the Chicago and North Western Railway Co., to acquire control of the Union Transfer Co. Interveners in the case contended that it was unlawful for two or more carriers by rail to gain control of a motor carrier. The part of section 213 (a) reads "It shall be lawful . . . for a carrier by railroad . . . to consolidate or merge with or acquire control of any motor carrier . . ." Interveners contended that the word "a" in front of carrier meant that only one railroad could acquire control of a motor carrier. The Examiner points out, however, that the article "a" is generally used in legal procedure not only as a singular term but is often used in the sense of meaning many. The importance of the case lies in trend toward consolidation of motor and rail facilities and the possibility that eventually the truck lines will be controlled by the large rail carriers. Testimony presented at the hearing demonstrated that the coordinated rail-truck service proposed would expedite the delivery from one to two days and that it would eliminate some freight train stops and over time service and reduce the number of train miles on certain branch lines. It was estimated that by eliminating the peddler cars on the C. & N. W. a saving of 55,677 car miles per month would result in Iowa and 37,910 car miles per month in Nebraska at a total estimated saving of $4,679. On the other hand long-haul traffic would be handled by the railroads which would have a tendency to relieve the public highways of burdensome long hauling traffic handled in heavy vehicles. I. C. C. Docket MCF-16.

## New Complaints Filed

*Sand*—New rates and reparation are sought on a alleged violation of section one in connection with the rates on molding sand from Elnora, Mechanicsville, Usher and Selkirk, N. Y., to Stamford Conn., in a complaint filed by Manghum and Manghum, attys., Transportation Bldg., Washington, D. C., in I. C. C. Docket No. 27,576, Yale & Towne Mfg. Co., Stamford, Conn., *v.* D. & Y. *et al.*

Alleging unreasonable rates and charges on molding sand from Stuyvesant, Selkirk and Catskill, N. Y., to Dunellen, N. J., reparation is sought in a complaint filed by S. H. Blake and W. F. Kavanah, Practitioners, 874 Broadway, N. Y., in I. C. C. Docket No. 27,583, R. Hoe and Co., Inc., New York, N. Y., *v.* N. Y. C. *et al.*


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# Foreign Developments

## Effect of Fluorides on Thermal Combinations

In the experiments reported in this article (following previous researches by the same authors), four kinds of Portland-cement raw mixtures were obtained, one from an actual cement mill and three prepared in the laboratory from limestone, ganister, coal ash, pyrite cinder and copper slag.

These raw mixtures were mixed with 0.5 and 1.0 per cent. of three fluorides, $CaF_2$, NaF and $MgF_2$, and heated at 1,200 to 1,350 deg. C. for 1 hr. The loss on heating the raw mixture, the free lime and the insoluble residue of the heated mass was carefully analyzed and the results compared with the raw mixture heated without fluoride. These results showed that: (1) NaF is most effective to the combination of the raw mixture; (2) $MgF_2$ is not so effective as $CaF_2$; (3) the effect of added fluoride on the combination of CaO with the acid components $SiO_2$, $Al_2O_3$ and $Fe_2O_3$ is most clearly seen by heating at 1,300 to 1,350 deg. C., because of the formation of calcium silicates $3CaO.SiO_2$ and $2CaO.SiO_2$; (4) the raw mixture of high ferric-oxide content combines completely even by heating at 1,300 to 1,350 deg. C. with a small amount of $CaF_2$.

Next the effects of the addition of feldspar, glass and a special mixture obtained from a calcium superphosphate factory as a by-product and composed principally of $SiO_2$ and NaF were studied by using one of the same raw Portland-cement mixtures and treating as in the former experiments with the object of comparing it with the effect of $CaF_2$. A comparison of the results showed decidedly: (1) That the special mixture obtained as a by-product from the superphosphate industry is most effective on account of its content (about 25 per cent.) of effective NaF; (2) that feldspar is rather more effective, when added in the rather large amount of 2 to 3 per cent. and heated at 1,300 to 1,350 deg. C. or over, than $CaF_2$ added in small amount; (3) that glass of the soda-lime-silica type is not so effective as $CaF_2$, etc.

The special mixture from the superphosphate factory, containing about 25 per cent. NaF and about 58 per cent. $SiO_2$ was again compared as to its effect on the thermal combination of calcium silicates by adding 0.5 to 1.0 per cent. to the mixture $3CaCO_3:SiO_2$ or $2CaCO_3:SiO_2$ as above reported. It was seen that the effect is quite proportional to the amount of NaF in the mixture; but the large content of silica (about 58 per cent.) in this special mixture lowers the molecular ratio of combined lime to combined silica.—Shoichiro Nagai and Masamichi Takahara in *Journal of the Society of Chemical Industry, Japan,* 39:183B-184B, June, 1936.

## Some Observations on Crushers and Screens

A review and critique of modern developments in the machinery for the production of crushed stone—crushers, grinding mills and screens—is published by Dr. Friedrich Procket in *Zement* (25:650-664) for Sept. 17, 1936. On the basis of the factual review of the machines themselves the author adds a number of suggestions for users and for manufacturers of the equipment concerned: (1) use of modern drives: replacement of long, dust-creating and inefficient (through friction losses) belt drives by unit drives, either by direct coupling with the electric motor or by wedge-belt drive; (2) vibrationless installation and cable suspension of machines on cables, with or without springs or rubber buffers; (3) thorough study of the bearing problem—the matter of dust-sealed ball and roller bearings is especially to be emphasized for crushers—further research on modern pressed materials as possible replacements of white metal and bronze bearings; (4) crushers should not be set to tasks for which they are not adapted; (5) in new installations the cheapest machine should not necessarily have preference; (6) crushed-stone plants should operate as free as possible from dust.

## Observes Acceleration in the Slaking of Lime

By means of a calorimetric process (diphenylmethane calorimeter) the authors were able to determine the activity of calcined lime and in connection therewith the approximate temperature of calcination. In the case of calcined marble the highest activity was found when the marble was burned at a temperature of 1,100 deg. C., which in 25 min. developed 330.5 cal., while marble calcined at 900 deg. C. in the same period developed 229.2 cal., and a specimen calcined at 1,000 deg. C. developed 280.4 cal. In the calcined limestone the highest activity occurred when burned at 1,000 deg. C., which is to be explained by the greater content of impurities as compared with marble. In the case of calcined chalk the highest activity occurred when calcined at 1,100 deg. C.

Further tests were made on the effect of the addition of various salts, and particularly good results were obtained with calcium chloride, where practically all the heat developed had been created at the end of 30 min. The accelerating effect of various salts is explained by their dispersion effect and the increased solubility of the lime.

Such acceleration of the slaking process of lime is of practical significance for the production of sand-lime brick or lime-clay brick in steam pressure, as well as in the refractory industry and in the production of silica brick.—Prof. P. P. Budnikoff and L. Gulinova in *Tonindustrie-Zeitung* 60:899-901, Sept. 10, 1936.

## Study of Cement Set in Labyrinth Calorimeter

Prof. W. Swietoslawski describes in a publication of the Warsaw Academy of Technical Sciences a labyrinth-flow calorimeter for measuring the heat developed in the hardening of cement, and results obtained with it. Various meth-

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ods had been investigated for studying the heating effects of long-continued processes such as the hardening of cement; at first an adiabatic calorimeter was employed, but this was only adapted to the direct determination of the heat of hardening of cement when the heating effect was low. The difficulty of following the interesting initial period of cement hardening by means of the adiabatic calorimeter led to the development of the labyrinth-flow calorimeter.

As the mixing of cement with water, the setting up of the apparatus and the reaching of a stationary state in the calorimeter takes some time, the measuring of the heat developed could only be begun 3 hr. after the mixing of the cement. The heat development was then followed for the first 35 hr. and the results plotted on curves. The studies indicate that the optimum heat development, that is, 41.56 cal., occurs with 248 g. of water to 1,000 g. of cement; with higher water content the same maximum value is obtained with very little difference, and with lower water content the heat developed falls rapidly.

For following the heating effect during the first 3 hr. Prof. Swietoslawski used a simple special method which, while open to objection as to exactness, gave consistent results, and as the heat developed during that period is very low, little error should occur in the total result.—*Zement* 25:665-666, Sept. 17, 1936.

## Tests Insulating Brick in Rotary Cement Kiln

Insulating brick (such as Silocel or Isolite) between the kiln shell and the fire-brick lining (chamotte, etc.) has both advantages and disadvantages, and whether or not the use of it is to be recommended depends upon a careful consideration of the circumstances of the installation. The most advantageous feature of such brick is the reduction of heat loss from the shell, and the most disadvantageous feature is the reduction of kiln capacity.

Experiments by the author show that the heat loss from the shell is reduced almost one half by the use of such insulating brick; that for the requirements of the rotary kiln the insulating brick available to-day is too weak in compressive strength, and the most needed improvements are on this point more than in the insulating capacity; the inside volume of a kiln using insulating brick is much reduced and the kiln capacity reduced about the same amount, in the present tests, about 5 per cent.—T. Yoshii in *Journal of the Society of Chemical Industry, Japan*, 39:204B-206B, June, 1936.

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# New Machinery and Supplies

## Develops New Heavy-Duty ⅜-Cu. Yd. Truck Shovel

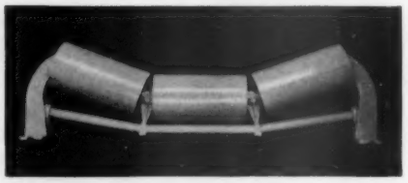
The Michigan Power Shovel Co., Benton Harbor, Mich., has developed a new heavy-duty ⅜-cu.yd. truck shovel which is especially adaptable to quarries and pits. It has a 13-in. chassis frame of high-tensile alloy steel, putting it in a class above that of the ordinary "truck-mounted" shovel. Full-circle swing, which allows loading over the front, makes this unit particularly efficient, especially when work must be carried on in close quarters. The Michigan's 25 m.p.h. road speed makes it ideal for those who carry on operations in scattered locations—a minimum of time is lost on the road between jobs. The extra-heavy duty motor and extra-heavy duty five-speed transmission with an extremely slow creeper gear make it a rugged, dependable unit with plenty of reserve power. The truck shovel is equipped with Lockheed hydraulic brakes with a safety vacuum reservoir and a separate emergency brake on the drive shaft. A positive lock on the turntable mechanism is within easy reach of the operator. The turntable mechanism is stabilized by ball-bearing top and hook rollers, relieving the center pintle from all strain. The boom is kept under complete control at all times by use of a safety pawl and a powerful brake. The controls are finger-tip air clutches, working with positive smoothness, eliminating fatigue and strain for the operator.

Heavy-duty ⅜-cu. yd. truck shovel.

## Truss-Frame Ball-Bearing Conveyor Carrier Presented

A new "truss-frame," sealed ball-bearing belt-conveyor carrier that is said to be light, strong and comparatively inexpensive, has recently been announced by Stephens-Adamson Mfg. Co. of Aurora, Ill. This carrier is of the 3-roll-in-line design with outer rollers inclined to give the belt a 20 deg. trough. The whole roller assembly is tilted to center the belt without guide rollers and particular effort has been made to produce a carrier that would minimize wear and tear on the conveyor belt. All parts are made of steel and malleable iron. The rollers are of 5-in. steel tubing with ends smoothly rounded over the pressed-steel end plates to prevent any tendency to fray the belt. Roller ends are recessed to house the bearings and allow rollers to be closely spaced to eliminate danger of pinching belts. Renewable, cartridge type ball-bearings are used throughout. Each bearing has been packed with grease and sealed at the factory and should be good for several years of operation before attention is necessary. The truss-type frame appears to be unusually light and rigid, with the load carried by a tension rod instead of depending upon the stiffness of a heavy cross member for support.

The carrier is being built in sizes for 18 in. to 48 in. belts.



Sealed ball-bearing conveyor carrier.

## New Air Tool Simplifies Breaking of Large Bowlders

Announcement has been made by the Atlantic Steel Co., 1775 Broadway, New York, N. Y., of the development of a pneumatic breaker to split large bowlders and pieces of stone in quarries and pits.

The new tool simplifies breaking these large pieces and eliminates the trouble and expense involved when explosives or the antiquated plug-and-feather method are employed. The breaker fits the standard hand drill and is made in several sizes with 1⅛-in. and 1¼-in. hexagon shanks.

The breaker is made of Atsco steel, the same material used in the drills manufactured by the company with which many operators are familiar.

Breaker for splitting large bowlders or pieces of quarried stone.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STURTEVANT MILL CO.
Harrison Square, BOSTON, MASS.

The above portable crushing and screening plant in operation near Hopkins, Minn., is an auxiliary unit which supplements the permanent plant operated by the S. J. Reader Co. of Minneapolis, Minn. Production has been averaging 100 cu.yd. per hr. and the power is supplied by a 125-hp. Caterpillar Diesel engine.

## New Blast-Hole Drill Used for Large-Diameter Holes

Built in answer to the growing demand for a blast-hole drill to put down large diameter (9 in. to 12 in.) holes at a faster drilling rate than previously possible, the 42-T is the newest and largest drill in the Bucyrus-Armstrong line.

The new machine is announced by the manufacturers as the "most modern, largest capacity, portable blast-hole drill on the market." It swings up to 6,000 lb. of cable-tools, providing tremendous drilling energy at the bottom of the hole. Wide-spread, full-length crawler mountings make moves easily and quickly. All-steel, welded construction throughout give the machine unusual strength, long life, and low maintenance expense.

Fast, large-diameter blast-hole drill.

Among the new features is a power-driven tool wrench which sets up and breaks tool joints entirely by power. Raising the 48-ft., telescoping derrick is also done by power from the engine.

A choice of 80-hp. Diesel engine or powerful electric motor is offered. Ample power is provided with these power plants to handle the exacting conditions which this new big drill is called upon to meet.

Full information concerning the new drill may be obtained by writing to Bucyrus-Erie Co., South Milwaukee, Wis.

**Three-year-old Joyce Alice Barrow, champion baby of Illinois, held the spotlight in recent dedication ceremonies at Caterpillar Tractor Co. plant. The event marked production of the Company's 20,000th Diesel. Standing beside Joyce is B. C. Heacock, Caterpillar president.**

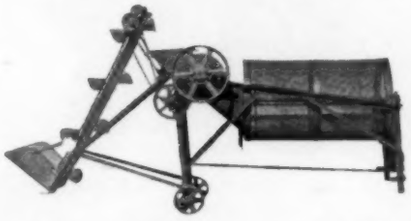
**This "Milestone Diesel," according to officials, represents 1,250,000 Diesel horsepower produced by the company in a little over five years.**

**The latest thing in dump trucks for pit and quarry service is the stream-lined model pictured above in service at the silica-sand operations of the Pennsylvania Glass Sand Corp., Lewistown, Pa. The truck is an Autocar; the dump body was supplied by the Easton Car & Construction Co.**

## Grinder-Screen Found Useful in Molding-Sand Production

For grinding, screening and loading industrial sand or crushed material, the Toro grinder and screen is giving exceptional results, according to reports of operators to its maker, the Toro Mfg. Corp., Minneapolis, Minn.

The machine can be operated by any type of motive power of 4 hp. or more. The 36-in. screen can be supplied with openings ranging from ⅛ in. to ½ in. Material is lifted to the grinding mill by a short bucket elevator, as the accompanying illustration shows.



**Grinder and screen serves important field, especially in production of molding sand.**

## Announces 4-Cyl. and 6-Cyl. Gasoline-Engine Models

The Hercules Motors Corp., Canton, O., in announcing the "QX" series engines and power units, has added two models to its present line of modern and advanced heavy-duty 4- and 6-cyl. engines. The "QX" series meets the requirements of the trade for a small six cylinder heavy duty engine.

The maximum torque of the "QXA" is 130 ft. lb. at 1000 r.p.m. and of the "QXB" is 135 ft. lb. at 1000 r.p.m. Both models peak at 3000 r.p.m. at which speed the "QXA" develops the 55.5 hp. and the "QXB" 60 hp. These two models are identical in general design and appearance and the majority of the parts are interchangeable, the only difference being in the bores and the parts affected thereby.

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COLUMBUS, OHIO

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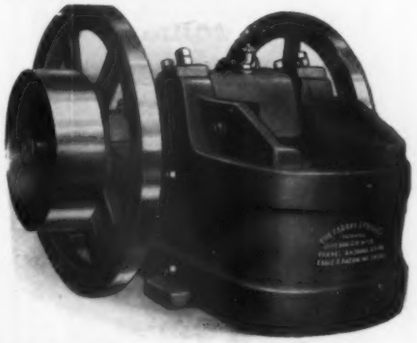
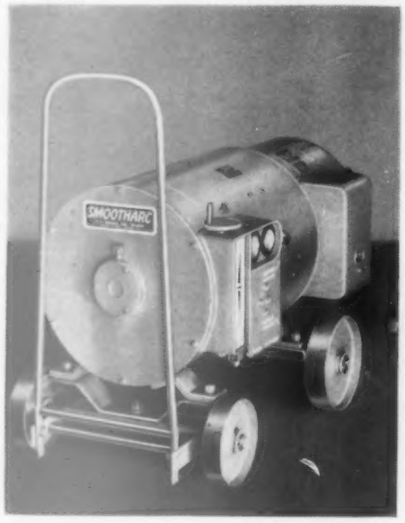
Complete Plants Designed and Equipped. Screens, Elevators, Conveyors, Quarry, Sand and Gravel Plant Equipment. Engineering Service.



EARLE C. BACON, Inc.
71 John Street York, New N. Y.

## Portable Arc-Welder Has Single Current Control

The Harnischfeger Corp., Milwaukee, Wis., announces a new line of simplified P&H Hansen "Smootharc" welders featuring single current control, self-excitation and internal stabilization, the qualities so necessary for fast, steady welding, deep penetration and uniform metal deposit. This new line of welders is built in two styles vertically mounted in 75, 100 and 150 ampere capacities and horizontally mounted in 200, 300, 400 and 600 ampere sizes. Both models are uniformly and compactly built, then streamlined to eliminate projecting parts and to allow easy portability.




New portable arc welder.

Single current control is the outstanding feature of this new line of "Smootharc" welders. It is made possible by the special patented design of shifting generator brushes. By means of a simple micrometer screw shifting device an infinite number of current settings is secured and the voltage is maintained automatically at a high value. A simple turn of one controlling dial quickly gives the desired welding current. All of which tends to simplify and speed up the welding operation.

## Diesel Engine Is Employed in Latest Model Dump Truck

The Hug Co., Highland, Ill., has announced its new Model 30 Lugger powered by the "Show Down" Caterpillar Diesel engine. Using low-cost Diesel fuels, unusually economical operation is claimed for this new hauling unit. The engine is a 4-cycle water-cooled model with a displacement of 831 cu. in. and A.M.A. rating of 52.9 hp. Transmission provides 12 speeds forward and three reverse. The Hug set-back wheel design allows exceptionally short turning radius and ease of handling.

Many innovations in design and construction are incorporated in the chassis of the new Hug Lugger. The entire frame is electrically arc-welded. Trusses, spring hangers, motor hangers, radius rod braces and box section cross members are all electrically arc welded to the side rails forming one rigid structure.

The body has the Hug "scoop end" with direct-reversible high-dumping angle hoist.

Diesel power is featured in this new dump truck.

There is no tail gate and the body sides are reinforced with I-beam steel ribs. It has 10-cu. yd. capacity and the maximum pay load of the unit is 30,000 lb.

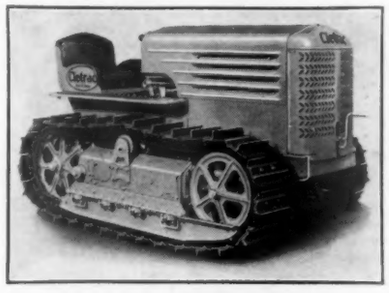
The first large order placed by a dump-truck operator in America for Diesel engines was recently executed by the B. Turecamo Contracting Co. of Brooklyn, N. Y. For years the Turecamo company has used Diesel engines almost exclusively in its fleet of towboats that are used to pull scows of gravel and crushed rock. In the spring of 1936, they made the first installation of a Diesel engine in one of their A. C. Mack dump trucks. So successful was the operation of the Cummins HB-4 engine that in early October they placed an order for 18 additional Cummins Diesel engines of the same type. This order completely Dieselized the company's fleet of Mack dump trucks.

Contrary to the prevalent belief that Diesels in trucks were only suitable for long-haul operations, the 19 Cummins-powered Turecamo dump trucks have definitely established that there are tremendous savings to be made on short-haul work.

Gathered about the Buda Diesel engine which operates the stone-crushing plant at the Guadalupe Dam project in Mexico the workmen and officials in charge posed for the above picture. The building of the dam is a government-financed job.

## Modern Streamlining Found in Newest Crawler Tractor

Giving new grace and beauty to mobile power units that have until now been built for endurance rather than eye appeal, for utility more than style, the new streamline design of the Cletrac crawler tractors eliminates sharp corners and projections and places them in a new style class.




Stream-lined crawler tractor.

Comfort for the operator is provided in coil-spring-cushioned seat, adjustable foot rests and controls that make operation as easy as driving a team. Exhaust and intake are hidden from view. The Cletrac patented features such as controlled differential steering, one-piece drop-forged shoe, track-support and lubrication design and the frame construction are the same as before. The Cletrac line includes crawler tractors from 22 to 94 hp. at the drawbar, powered with internal combustion or Diesel engines.

In order to speed up the dispatching of trucks, the New York Trap Rock Co. recently placed the Model 80 Haiss portable loader pictured above in service at its plant at Hackensack, N. J. Aggregates are stockpiled in the yard so that this single machine can take care of all loading requirements.


Fight SILICOSIS with... COVER'S DUPOR PLATE No. 24

A New RESPIRATOR

Approved by U. S. Bureau of Mines No. B. M. 2111 . . . because it provides protection against "Type A" or Pneumoconiosis (SILICOSIS) producing dusts! New design eliminates Screw Caps! Filter Pads firmly anchored prevent leakage! Filter Apertures increased to 24 square inches! Bureau of Mines Approved Face Cloth for comfort! Clear Vision Assured—Compact, fits the pocket—Weighs only 4 ounces (without pads)—Long Filter Life at Low Cost! Write for details—Price, $27.00 per dozen. Order Today!

SAMPLE POSTPAID..... $2.25

H. S. COVER

Chippewa "B," South Bend, Ind.

**This 75-ton fireless locomotive is the latest type built by the H. K. Porter Co., Pittsburgh, Pa., and was supplied the Columbia Alkali Corp., a division of the Pittsburgh Plate Glass Co. Charged with steam from a stationary plant, this type of locomotive is said to possess numerous advantages including cleanliness, no fire hazard, no smoke nuisance, and economy of operation.**

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## Book Reviews

CONSUMER COOPERATION IN AMERICA, *by Bertram B. Fowler. Published by the Vanguard Press, New York, N. Y. 305 p. Price $2.00.*

The amazing growth of the consumer cooperative movement in America, traced back to the founding of the idea by a group of wretchedly-paid weavers in Rochdale, England, nearly 90 years ago, is unfolded in this easy-to-read and easy-to-understand volume. The author presents statistics showing the growth of some consumer organizations and shows how to organize a cooperative. Being a proponent of the movement, his viewpoint is often biased but the statements seem to be well substantiated. Pres. Roosevelt's recent appointment of a commission of three to investigate the movement in Europe, where it has had its greatest growth, with the possibility of his encouragement and aid in developing cooperatives in this country lends unusual timeliness to this work.

HANDBOOK OF ENGINEERING FUNDAMENTALS, *by Ovid W. Eschbach. Published by John Wiley & Sons, New York, N. Y. 1081 p. Price $5.00.*

Here is a new "bible" for the engineering profession. The Wiley Handbooks, so well known, are now based on this volume which embodies those fundamental laws and theories of science which are basic to engineering practice. It is, essentially, a summary of the principles of mathematics, physics and chemistry, the prospectus and uses of engineering materials, the mechanics of solids and fluids, and contains the commonly used mathematical and physical tables. Thus, with the exception of the technics of surveying and drawing, there is included the fundamental technology common to nearly all engineering curricula.

## Incorporations

SILICA SANDS CORP., Clark County, Nev. Capital stock 1,000 shares. Incorporated by George Snoreen, Overton, Nev., Paul G. Nunn, Oakland, Cal., and Samuel J. Nunn, Los Angeles, Cal.

OHIO COUNTY LIME & ROCK CO., Hartford, Ky. Incorporated by Ira Dougherty and W. H. Dunn to produce lime and crushed stone.

GASTONIA QUARRIES, INC., Gastonia, N. C. Capital stock $25,000. Incorporated by John O. Gaither, Gastonia and W. S. Hall, Charlotte, N. C.

HELENA CONCRETE PRODUCTS MFG. CO. To manufacture bricks and produce gravel. J. E. Daniels is president.

HIGHWAY HI-TEST SAND & GRAVEL CO., Jackson, Miss. To produce sand and gravel.

HANSBERGER STONE CO. Mt. Vernon, Ind. Capital stock 100 shares n.p.v. Incorporators are Charles O. Wesselman, J. M. Motoux, Fred H. Hahn and Thomas M. Hansberger. To quarry and crush stone.

THE O'NEAL ROCK & SAND CO., INC. Miami, Fla. Incorporated by George J. Ramsey and F. M. Desjardins.

THE TEXAS MARBLE CO., Austin, Tex. Capital $10,000. Incorporated by J. O. Barrow and R. V. Anderson. Will produce crushed marble.

PUNGO SANDS CO., Durham, N. C. Capital $10,000. Incorporated by J. D. Smith and Southgate Jones.

PANAMA CONCRETE PRODUCTS CO., Panama City, Fla. Incorporated by William Paxton and B. E. Melton.

## Trade Literature

*The Minogue Agitator for Cement Mills.* 4 p. Manitowoc Engineering Works, Manitowoc, Wis.

*Norma-Hoffmann Cartridge Precision Ball Bearings.* 8 p. Norma-Hoffmann Bearings Corp., Stamford, Conn.

*Brown Thermometers and Pressure Gauges.* 72 p. Brown Instrument Co., Philadelphia, Pa.

*Cooper-Bessemer Type EN Diesel Engines.* 8 p. Cooper-Bessemer Corp., Mt. Vernon, O.

*Blaw-Knox TrukMixers and Agitators.* 16 p. Blaw-Knox Co., Pittsburgh, Pa.

*Exolon High Intensity Magnetic Separators.* 4 p. Exolon Co., Blasdell, N. Y.

*Power Plant Measuring Instruments.* (Folder) Leeds & Northrup Co., Philadelphia, Pa.

*Koehring Long Range Draglines.* 8 p. Koehring Co., Milwaukee, Wis.

*Davis-McDonald Safety Hat.* 4 p. Davis Emergency Equipment Co., New York, N. Y.

*The Coroc Diamond Drill.* 4 p. Ingersoll-Rand Co., Phillipsburg, N. J.

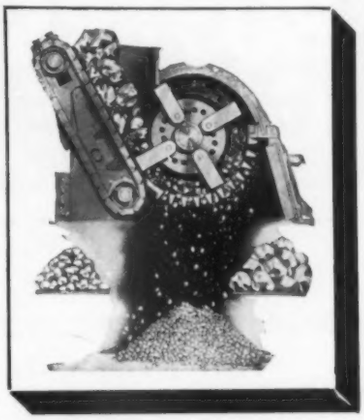
*Nickel-Manganese-Steel Applicator Bars.* 4 p. Stulz-Sickles Co., Newark, N. J.

*Compressed Air at Lower Cost.* 4 p. Worthington Pump & Machinery Corp., Harrison, N. J.

*All-Safe Lifeline Grab.* 4 p. American All-Safe Co., Buffalo, N. Y.

*The Cameron Coupled Pump.* 16 p. Ingersoll-Rand Co., Phillipsburg, N. J.

*Data on Controlled Vibration and Screen Efficiency.* 4 p. Productive Equipment Corp., Chicago, Ill.

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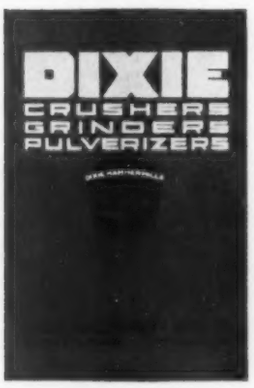


**DIXIE MACHINERY MFG. COMPANY**
4209 Goodfellow Ave., St. Louis, Mo.

# BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

Although every effort is made to insure accuracy and completeness in these listings, the publisher cannot accept responsibility for errors or omissions. Any mistakes discovered will gladly be rectified.

Index to Advertisers on Page 96

**Aftercoolers (Air)**
Worthington Pump & Machy. Corp.

**Aggregate-Bituminizing Plants**
Hetherington & Berner, Inc.

**Agitating Ladders (Dredge)**
*Eagle Iron Works

**Agitators, Thickness and Slurry Mixers**
*Hardinge Co.
*Manitowoc Engr. Works
Patterson Fdry. & Machine Co.
*Traylor Engr. & Mfg. Co.

**Air Compressors (Portable)**
*Fuller Co.
*Traylor Engr. & Mfg. Co.
Worthington Pump & Machy. Corp.

**Air Compressors (Stationary)**
*Fuller Co.
*Traylor Engr. & Mfg. Co.
Worthington Pump & Machy. Corp.

**Air Filters**
*American Fdry. Equip. Co.
*Western Precipitation Co.

**Air Pumps**
*Fuller Co.
Worthington Pump & Machy. Corp.

**Air Separators**
*Gruendler Crusher & Pulverizer Co.
*Hardinge Co.
Patterson Fdry. & Machine Co.
*Raymond Bros. Impact Pulv. Co.
Sturtevant Mill Co.
*Williams Patent Crusher & Pulverizer Co.

**Alloys (Steel)**
American Manganese Steel Co.
Chain Belt Co.
Chicago Steel Foundry Co.
Manganese Steel Forge Co.
Taylor-Wharton Iron & Steel Co.

**Arresters (Lightning)**
*General Electric Co.

**Ash and Refuse-Handling Equipment**
*Allen-Sherman-Hoff Co.
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link Belt Co.
*Robins Conveying Belt Co.

**Automatic Feeders**
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
*Fuller Co.
*Hardinge Co.
*Jeffrey Mfg. Co.
*Link Belt Co.
Patterson Fdry. & Machine Co.

**Automatic Weighers**
*Bartlett & Snow Co., C. O.
*Fuller Co.

**Backfillers**
*Harnischfeger Corp.
*Lima Locomotive Works, Inc.
Northwest Engr. Co.

**Balls (Grinding)**
*Bartlett & Snow Co., C. O.
*Hardinge Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Manganese Steel Forge Co.
Patterson Fdry. & Machine Co.
Taylor-Wharton Iron & Steel Co.

**Balls (Tube-Mill, etc.)**
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
*Hardinge Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Manganese Steel Forge Co.
Patterson Fdry. & Machine Co.

**Barges (Steel)**
*Manitowoc Engr. Works.

**Baskets (Dipping)**
Buffalo Wire Works Co.

**Batteries**
*General Electric Co.
Goodyear Tire & Rubber Co.

**Bearings (Anti-Friction)**
*Bartlett & Snow Co., C. O.
Hetherington & Berner, Inc.
*Link-Belt Co.
*Robins Conveying Belt Co.

**Belt Drives**
Chain Belt Co.

**Belting**
*Cincinnati Rubber Mfg. Co.
Goodyear Tire & Rubber Co.
Haiss Mfg. Co., Geo.
Hewitt Rubber Corp.
*Link-Belt Co.
Republic Rubber Co.
*Robins Conveying Belt Co.
Worthington Pump & Machy. Corp.

**Belting (Multiple V)**
Goodyear Tire & Rubber Co.
Republic Rubber Co.

**Belts (Fan)**
Goodyear Tire & Rubber Co.
Republic Rubber Co.

**Bin Gates**
*Allen-Sherman-Hoff Co.
*Bartlett & Snow Co., C. O.
Chain Belt Co.
*Fuller Co.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Industrial Brownhoist Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
Manganese Steel Forge Co.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
Smith Engr. Works
Stedman's Fdry. & Machine Works.
*Traylor Engr. & Mfg. Co.

**Bins (Cast Iron)**
*Allen-Sherman-Hoff Co.

**Bins (Concrete)**
Marietta Concrete Corp.

**Bins (Steel)**
*Bartlett & Snow Co., C. O.
*Hendrick Mfg. Co.
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
Manganese Steel Forge Co.
McLanahan and Stone Corp.
Patterson Fdry. & Machine Co.
*Pioneer Gravel Equip. Mfg. Co.
*Robins Conveying Belt Co.

**Blast-Hole Drills (See Drills—Blast-Hole)**

**Blasting Supplies**
*Ensign-Bickford Co.

**Blocks (Sheave)**
American Manganese Steel Co.
Haiss Mfg. Co., Geo.
*Sauerman Bros., Inc.

**Bodies (Motor Truck, Concrete Mixing)**
*Bartlett & Snow Co., C. O.
Chain Belt Co.
Jaeger Machine Co.

**Boots (Rubber)**
Goodyear Tire & Rubber Co.

**Borings, Core**
Hoffman Bros. Drilling Co.
Pennsylvania Drilling Co.

**Blowers**
Worthington Pump & Machy. Corp.

**Breakers (Circuit)**
*General Electric Co.

**Brick Manufacturing Equipment**
Patterson Fdry. & Machine Co.

**Bronze Work (Ornamental)**
Buffalo Wire Works.
National Wire Cloth Co.
*Tyler Co., W. S.

**Buckets (Dump)**
Dempster Bros., Inc.

**Bucket Elevators (See Conveyors and Elevators)**

**Buckets (Clamshell, Orange-Peel, Etc.)**
*Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
*Harnischfeger Corp.
Industrial Brownhoist Corp.
*Link-Belt Co.
Owen Bucket Co.
Taylor-Wharton Iron & Steel Co.

**Buckets (Dragline—Cableway)**
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
*Link-Belt Co.
*Page Engr. Co.
*Pioneer Gravel Equip. Mfg. Co.
*Sauerman Bros., Inc.

**Buckets (Elevator and Conveyor)**
*Bartlett & Snow Co., C. O.
Chain Belt Co.
Cross Engr. Co.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Industrial Brownhoist Corp.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.
McLanahan and Stone Corp.
*Pioneer Gravel Equip. Mfg. Co.
*Robins Conveying Belt Co.
Smith Engr. Works

**Buggies (Dump)**
*Koehring Co.

**Cableways**
*Link-Belt Co.
*Page Engr. Co.
*Roebling's Sons Co., John A.
*Sauerman Bros., Inc.

**Capstans (See Winches and Capstans)**

**Car Dumpers**
Industrial Brownhoist Corp.
*Link-Belt Co.

**Car Pullers**
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.

**Carriers**
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works

**Carryalls**
*Koehring Co.

**Car Wheels — (See Wheels — Car)**

**Castings**
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
Chain Belt Co.
Chicago Steel Foundry Co.
*Eagle Iron Works
*Hardinge Co.
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
Patterson Fdry. & Machine Co.
*Robins Conveying Belt Co.
Taylor-Wharton Iron & Steel Co.

**Cement Pumps (See Pumps: Air Pumps; Pumps, Cement Slurry; Pumps, Bulk Cement)**

**Chain (Dredge and Shovel)**
Manganese Steel Forge Co.

**Chain Drives**
Chain Belt Co.
*Link-Belt Co.

**Chain (Elevating and Conveying)**
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
Chain Belt Co.
Cross Engr. Co.
Haiss Mfg. Co., Geo.
Industrial Brownhoist Corp.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.

**Chute Lining (Rubber)**
Goodyear Tire & Rubber Co.

**Chutes and Chute Liners**
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
Chain Belt Co.
Cross Engr. Co.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Patterson Fdry. & Machine Co.
*Robins Conveying Belt Co.

**Classifiers**
*Deister Machine Co.
*Hardinge Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Knickerbocker Co.
Lewistown Foundry & Machine Co.
*Link-Belt Co.
Patterson Fdry. & Machine Co.
Simplicity Engr. Co.

**Clips (Wire Rope)**
*Roebling's Sons Co., John A.

**Clutches**
*Jeffrey Mfg. Co.
*Link-Belt Co.

**Coal-Pulverizing Equipment**
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Bonnot Co.
*Hardinge Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Patterson Fdry. & Machine Co.
*Raymond Bros. Impact Pulv. Co.
*Williams Patent Crusher & Pulverizer Co.

**Compressors (See Air Compressors)**

**Concentrators (Slurry)**
*Deister Concentrator Co.

**Concrete Breakers (Air)**
Worthington Pump & Machy. Corp.

**Concrete Mixers**
Jaeger Machine Co.

**Concrete Slab-Raising Equipment (Mud-Jacks)**
*Koehring Co.

**Cones (Sand-Washing)**
*Bartlett & Snow Co., C. O.
*Link-Belt Co.
Smith Engr. Works

**Controllers (Electric)**
*General Electric Co.

**Converters (Electric)**
*General Electric Co.

**Conveyor Belting (See Belting)**

**Conveyor Idlers and Rolls**
*Bartlett & Snow Co., C. O.
Chain Belt Co.
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

**Conveyors and Elevators**
*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
Bacon, Inc., Earle C.
*Bartlett & Snow Co., C. O.
Chain Belt Co.
Chicago Steel Foundry Co.
Cross Engr. Co.
*Fuller Co.
*Gruendler Crusher & Pulverizer Co.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Industrial Brownhoist Corp.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
McLanahan and Stone Corp.
New Holland Machine Co.
Patterson Fdry. & Machine Co.
*Pioneer Gravel Equip. Mfg. Co.
*Robins Conveying Belt Co.
Smith Engr. Works
Sturtevant Mill Co.
*Traylor Engr. & Mfg. Co.

**Conveyors (Pneumatic)**
*Fuller Co.

**Conveyors (Ready-Mixed Concrete)**
*Bartlett & Snow Co., C. O.
Chain Belt Co.
Haiss Mfg. Co., Geo.
Jaeger Machine Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

**Coolers (Clinker)**
*Allis-Chalmers Mfg. Co.

**Coolers (See Kilns and Coolers—Rotary)**

**Couplings (Flexible and Shaft)**
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

**Cranes (Crawler and Locomotive)**
*Bay City Shovels, Inc.
*Harnischfeger Corp.
Industrial Brownhoist Corp.
*Koehring Co.
*Lima Locomotive Works, Inc.
*Link-Belt Co.
*Manitowoc Engr. Works.
Michigan Power Shovel Co.
Northwest Engr. Co.
Thew Shovel Co.

**Cranes (Electric Traveling)**
*Harnischfeger Corp.
Industrial Brownhoist Corp.

* See also information in the 1936 Pit and Quarry HANDBOOK.

# TRAYLOR
## TYPE TY REDUCTION CRUSHER

### TWO USERS

wrote us recently,—and voluntarily—expressing their unqualified approval, in enthusiastic terms, of their Traylor Type TY Reduction Crushers. They are only two of many hard-headed operators who have learned what they wanted in a reduction crusher by the expensive process of NOT finding it in numerous machines they have tried. Having FOUND it in a Traylor TY, naturally they like to "tell the world they did!"

All of the whys and wherefores are printed in our bulletin No. 112. Send for your copy now!

## TRAYLOR
### ENGINEERING & MFG. CO.
**Allentown, Pa.**

NEW YORK CITY 3916 Empire State Bldg. | CHICAGO 2151 One La Salle St. Bldg. | SALT LAKE CITY 101 West Second South St.
LOS ANGELES 919 Chester William Bldg. | SEATTLE 6311 22nd Ave., N. E. | Timmins, Ontario, Canada P. O. Box 113
MANILA MACH. & SUPPLY CO. Manila and Baguio, P. I. | Robins Conveyors (So. Africa) Inc. Johannesburg, Transvaal, S. A.

**Expert Department—104 Pearl St., New York City.**
**Foreign Sales Agencies: London, Lima, Sao Paulo, Rio de Janeiro, Buenos Aires, Santiago, Valparaiso, Antofagasta, Iquique, Oruro**
**European Works—Usines Carels Freres, Ghent, Belgium**

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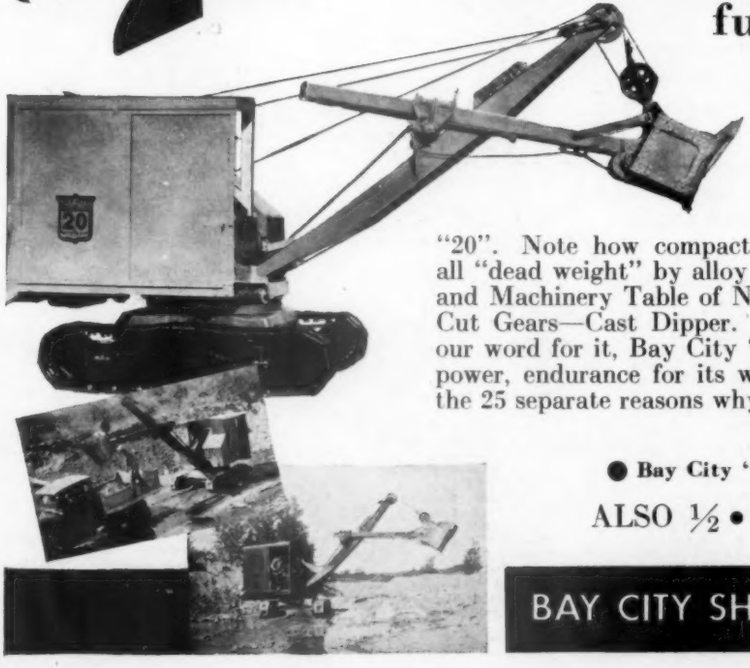
## Bay City "20"

## the biggest "little" shovel on the market



### full swing—3/8 yard safe 4-ton crane load . . .

There are ten models of Bay City Shovels—but Bay City "20" is the greatest buy on the market if you want pep and power packed into small space. LOOK INSIDE THE CAB of a Bay City "20". Note how compact, yet sturdy and efficient. We've eliminated all "dead weight" by alloy steels and heat treating. Unit Cast Car Body and Machinery Table of Nickel-Manganese Steel. Chain Crowd—Helical Cut Gears—Cast Dipper. Space forbids us to tell all the details—take our word for it, Bay City "20" is not a TOY. It tops the field in speed, power, endurance for its weight and price. Write today for the details, the 25 separate reasons why it will pay you today.

● **Bay City "20" no matter what your shovel needs.**

ALSO 1/2 • 5/8 • 3/4 • 7/8 • 1-1¼ YD. SIZES

**BAY CITY SHOVELS Inc. BAY CITY, MICH.**

# BUYERS' GUIDE

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*American Pulverizer Co.
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Stedman's Fdry. & Machine Works.
Taylor-Wharton Iron & Steel Co.
**Crushers (Cone)**
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**Crushers (Hammer)**
*Allis-Chalmers Mfg. Co.
*American Pulverizer Co.
*Bartlett & Snow Co., C. O.
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*Dixie Machy. Mfg. Co.
*Gruendler Crusher & Pulverizer Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng Corp
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**Crushers (Jaw and Gyratory)**
*Allis-Chalmers Mfg. Co.
Bacon, Inc., Earle C.
*Bartlett & Snow Co., C. O.
*Gruendler Crusher & Pulverizer Co.
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*Kennedy-Van Saun Mfg. and Eng. Corp.
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**Crushers (Ring)**
*American Pulverizer Co.
*Bartlett & Snow Co., C. O.
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*Williams Patent Crusher & Pulverizer Co.
**Crushers (Roll)**
*Allis-Chalmers Mfg. Co.
*American Pulverizer Co.
*Bartlett & Snow Co., C. O.
Bonnot Co.
*Gruendler Crusher & Pulverizer Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
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*Pioneer Gravel Equip. Mfg. Co.
*Robins Conveying Belt Co.
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*Williams Patent Crusher & Pulverizer Co.
**Crushers (Rotary)**
*Allis-Chalmers Mfg. Co.
*American Pulverizer Co.
*Bartlett & Snow Co., C. O.
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*Williams Patent Crusher & Pulverizer Co.
**Crushing Rolls**
*Allis-Chalmers Mfg. Co.
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*Bartlett & Snow Co., C. O.
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*Link-Belt Co.
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*Williams Patent Crusher & Pulverizer Co.
**Diesel Engines (See Engines—Diesel)**
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American Manganese Steel Co.
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**Dippers and Teeth (Power Shovel)**
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*Koehring Co.
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**Dragline Cableway Excavators**
*Link-Belt Co.
*Page Engr. Co.
*Sauerman Bros., Inc.
**Dragline Excavators**
*Bay City Shovels, Inc.
*Harnischfeger Corp.
Industrial Brownhoist Corp.
*Koehring Co.
*Lima Locomotive Works, Inc.
*Link-Belt Co.
*Manitowoc Engr. Works.
Michigan Power Shovel Co.
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*Page Engr. Co.
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**Dredges**
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*Morris Machine Works
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*Jeffrey Mfg. Co.
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**Drives (Multiple, Belt, Chain, Rope)**
*Allis-Chalmers Mfg. Co.
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*Allis-Chalmers Mfg. Co.
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*American Fdry. Equip. Co.
*Bartlett & Snow Co., C. O.
*Western Precipitation Co.
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*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
*American Fdry. Equip. Co.
*Bartlett & Snow Co., C. O.
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*Raymond Bros. Impact Pulv. Co.
*Western Precipitation Co.
**Dust Conveying Systems**
*Allen-Sherman-Hoff Co.
*American Fdry. Equip. Co.
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*Allis-Chalmers Mfg. Co.
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*Allis-Chalmers Mfg. Co.
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*Bartlett & Snow Co., C. O.
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*Fuller Co.
Hetherington & Berner, Inc.
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*Robins Conveying Belt Co.
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**Engines (Diesel)**
Atlas Imperial Diesel Engine Co.
*Cooper-Bessemer Corp.
*Fairbanks, Morse & Co.
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*Page Engr. Co.
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Atlas Imperial Diesel Engine Co.
*Cooper-Bessemer Corp.
*Fairbanks, Morse & Co.
Nordberg Mfg. Co.
*Page Engr. Co.
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*Morris Machine Works
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*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
**Feeders**
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
Bonnot Co.
Chain Belt Co.
*Fuller Co.
*Hardinge Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
Patterson Fdry. & Machine Co.
*Pioneer Gravel Equip. Mfg. Co.
*Robins Conveying Belt Co.
Smith Engr. Works
**Feed Water Heaters**
Worthington Pump & Machy. Corp.
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Buffalo Wire Works Co.
**Floor Sweeping Systems (Hydro Vacuum)**
*Allen-Sherman-Hoff Co.
**Fuses (Detonating)**
*Ensign-Bickford Co.
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*General Electric Co.
**Gaskets**
*Cincinnati Rubber Mfg. Co.
Goodyear Tire & Rubber Co.
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Republic Rubber Co.
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**Gates (Bin)** (See Bin Gates)
**Gates (Clamshell)**
Haiss Mfg. Co., Geo.
*Link-Belt Co.
**Gears (Herringbone)**
*Bartlett & Snow Co., C. O.
Chain Belt Co.
*General Electric Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
**Gears and Pinions**
*Bartlett & Snow Co., C. O.
Chain Belt Co.
*General Electric Co.
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
**Gelatin (See Explosives)**
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**Generator Sets (Engine)**
*General Electric Co.
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*General Electric Co.
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*General Electric Co.
**Glass Sand Equipment**
Lewistown Foundry & Machine Co.
**Goggles**
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**Grapples**
Owen Bucket Co.
**Grating (Steel)**
*Bartlett & Snow Co., C. O.
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**Grizzlies**
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
*Eagle Iron Works
*Hendrick Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdy. & Mach. Co.
Manganese Steel Forge Co.
*Robins Conveying Belt Co.
Smith Engr. Works
*Traylor Engr. & Mfg. Co.
**Guards (Wire)**
*Bartlett & Snow Co., C. O.
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**Guns (Hydraulic)**
Hetherington & Berner, Inc.
Taylor Forge & Pipe Works
**Hammer Mills (See Crushers—Hammer)**
**Haulage Systems (Electric)**
*General Electric Co.
**Hoists**
*Bartlett & Snow Co., C. O.
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*Pioneer Gravel Equip. Mfg. Co.
*Sauerman Bros., Inc.
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**Hoppers**
*Hendrick Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.
**Hose (Air, Steam and Water)**
*Cincinnati Rubber Mfg. Co.
Goodyear Tire & Rubber Co.
Hewitt Rubber Corp.
Republic Rubber Co.
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**Hose (Radiator-Engine Cooling)**
Goodyear Tire & Rubber Co.
Republic Rubber Co.
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**Idlers**
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
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*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works
**Kilns and Coolers (Rotary)**
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
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*General Electric Co.
**Lime-Handling Equipment**
*Bartlett & Snow Co., C. O.
*Fuller Co.
*Hardinge Co.
*Jeffrey Mfg. Co.
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*Raymond Bros Impact Pulv. Co.
*Robins Conveying Belt Co.
**Lime and Hydrating Plants**
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*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
**Linings (Ball- and Tube-Mill (See Mill Liners and Linings)**
**Loaders and Unloaders**
*Bartlett & Snow Co., C. O.

* See also information in the 1936 Pit and Quarry HANDBOOK.

# *Here's the way it started..*

## and here's what happened

The Michigan Alkali Company made their first purchase of Cordeau-Bickford in June, 1916. Quoting Mr. Bingham, the superintendent: . . . "we are perfectly satisfied with results obtained and have never considered going back to the old method of detonating with several electric blasting caps in each hole. We believe no other method is as dependable as Cordeau."

There is, naturally, a reason for the constantly increasing use of Cordeau-Bickford by progressive operators. They have found that distinct advantages offered by Cordeau result in greater efficiency, reduced costs, less hazard to the workmen and controlled fragmentation: important factors in every blasting operation.

***Blasting at Michigan Alkali Co., Alpena, Mich.***

The following figures were supplied in connection with the blast which is shown being prepared in the above illustration:

| | |
|---|---|
| Pounds of dynamite used | 8,250 |
| Number of holes | 34 |
| Average depth of holes | 48 ft. |
| Distance back from face | 18 ft. |
| Total length of blast | 476 ft. |
| Cordeau fuse used | 1,675 ft. |
| Tons of rock displaced (Limestone) | 31,600 |

Send for a copy of our Centennial Book and let us tell you more about Cordeau-Bickford.

**The ENSIGN-BICKFORD Company**
**Simsbury . . . . . Connecticut**
SAFETY FUSE SINCE 1836

CB57 *Cordeau-Bickford Detonating Fuse*

# ROBINS Gyrex Screens

The greater marketability of aggregates screened with the Robins "Gyrex" would alone warrant its adoption as an essential part of plant equipment. But beyond the fact that it does better work, it pays for itself again and again in savings from lower consumption of power, less space taken up and higher capacity. Robins Gyrex Screen has set new standards of accuracy and screening efficiency. Send for full particulars.

*For the Aggregates Industries*

***Belt Conveyors, Bucket Elevators, Gyrex and Vibrex Screens, Super Gyraloy Screen Cloth, Feeders, Gates, Mead-Morrison Hoists and Grab Buckets and all their parts and accessories.***

MATERIAL HANDLING ROBINS EQUIPMENT

*Robins products are described in various bulletins. Send for those of interest to you.*

ROBINS CONVEYING BELT CO.,
15 Park Row, New York, N. Y.

Please send me bulletin describing.....

*Name* .....

*Firm* .....

*Address* .....

*Town*..... *State*.....

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*Robins Conveying Belt Co.
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*General Electric Co.

**Locomotives (Electric, Gas, Kerosene and Steam)**
*General Electric Co.
*Lima Locomotive Works

**Locomotives (Gas-Electric)**
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**Locomotives (Oil-Electric)**
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**Locomotives (Storage Battery)**
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*Jeffrey Mfg. Co.

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Taylor-Wharton Iron & Steel Co.

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*General Electric Co.

**Mechanical Rubber Goods**
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Hewitt Rubber Corp.
Republic Rubber Co.

**Mill Liners and Linings**
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*Hardinge Co.
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*Fairbanks, Morse & Co.
*General Electric Co.
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*Deister Concentrator Co.

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*Cincinnati Rubber Mfg. Co.
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Buffalo Wire Works Co.
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*Koehring Co.

**Perforated Metal Plates**
*Allis-Chalmers Mfg. Co.
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**Pipe, Dredge (Floating and Shore)**
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*Fuller Co.
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*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

**Portable Crushing and Screening Plants**
*Bartlett & Snow Co., C. O.
*Gruendler Crusher & Pulverizer Co.
*Jeffrey Mfg. Co.
*Pioneer Gravel Equip. Mfg. Co.
Toro Mfg. Corp.
*Williams Patent Crusher & Pulverizer Co.

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*Bartlett & Snow Co., C. O.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Raymond Bros. Impact Pulv. Co.

**Pulverizers (See also Crushers: Mills: etc.)**
*American Pulverizer Co.
*Bartlett & Snow Co., C. O.
Bonnot Co.
*Gruendler Crusher & Pulverizer Co.
*Hardinge Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Knickerbocker Co.
Lewistown Foundry & Machinery Co.
New Holland Machine Co.
Patterson Fdry. & Machine Co.
*Raymond Bros. Impact Pulv. Co.
Stedman's Fdry. & Machine Works
Sturtevant Mill Co.
Toro Mfg. Corp.
Traylor Engr. & Mfg. Co.
*Williams Patent Crusher & Pulverizer Co.

**Pump Parts**
Taylor-Wharton Iron & Steel Co.

**Pump Valves** (See Valves, Pump)

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*Fuller Co.

**Pumps (Bulk Cement)**
*Fuller Co.

**Pumps (Cement Slurry)**
*Allen-Sherman-Hoff Co.
*Morris Machine Works

**Pumps (Centrifugal)**
*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Chain Belt Co.
*Fairbanks, Morse & Co.
Hetherington & Berner, Inc.
Kansas City Hay Press Co.
*Morris Machine Works
Worthington Pump & Machy. Corp.

**Pumps (Dredging)**
*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Fairbanks, Morse & Co.
Hetherington & Berner, Inc.
Kansas City Hay Press Co.
*Morris Machine Works
Worthington Pump & Machy. Co.

**Pumps (Sand and Gravel**
*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Fairbanks, Morse & Co.
Hetherington & Berner, Inc.
Kansas City Hay Press Co.
*Morris Machine Works

**Pumps (Slip)**
Patterson Fdry. & Machine Co.

**Pumps (Vacuum)**
*Fuller Co.

**Recuperators**
*Manitowoc Engr. Works

**Respirators**
Cover, H. S.

**Rheostats**
*General Electric Co.

**Rock Drills** (See Drills—Rock)

**Rod Mills**
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Patterson Fdry. & Machine Co.
*Traylor Engr. & Mfg. Co.

**Rods (Welding)**
American Manganese Steel Co.
Stulz-Sickles Co.
Taylor-Wharton Iron & Steel Co.

**Rope (Wire)** (See Wire Rope)

**Rubbish Burners**
Cross Engr. Co.

**Safety Equipment**
Cover, H. S.

**Sand Separators**
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Patterson Fdry. & Machine Co.
*Pioneer Gravel Equip. Mfg. Co.
Simplicity Engr. Co.
Smith Engr. Works

**Sand—Lime—Brick Machinery**
*Hardinge Co.

**Sand-Settling Tanks**
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Patterson Fdry. & Machine Co.
*Pioneer Gravel Equip. Mfg. Co.
Smith Engr. Works

**Scales**
*Fairbanks, Morse & Co.

**Scales (Track and Truck)**
*Fairbanks, Morse & Co.

**Scrapers (Power Drag)**
*Link-Belt Co.
*Pioneer Gravel Equip. Mfg. Co.
*Sauerman Bros., Inc.

**Screens**
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Audubon Wire Cloth Corp.
Bacon, Inc., Earle C.
*Bartlett & Snow Co., C. O.
Buffalo Wire Works Co.
Chain Belt Co.
Chicago Perforating Co.
Cleveland Wire Cloth & Mfg. Co.
Cross Engr. Co.
*Deister Concentrator Co.
*Deister Machine Co.
*Eagle Iron Works
*Gruendler Crusher & Pulverizer Co.
Haiss Mfg. Co., Geo.
*Hardinge Co.
*Hendrick Mfg. Co.
Industrial Brownhoist Corp.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
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*Link-Belt Co.
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*Pioneer Gravel Equip. Mfg. Co.
*Productive Equip. Corp.
*Roebling's Sons Co., John A.
*Robins Conveying Belt Co.
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Smith Engr. Works
Sturtevant Mill Co.
Symons Bros. Development Co.
Taylor-Wharton Iron & Steel Co.
Toro Mfg. Corp.
*Traylor Engr. & Mfg. Co.
*Tyler Co., W. S.

**Screens (Vibrating or Shaking)**
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Buffalo Wire Works Co.
*Deister Concentrator Co.
*Deister Machine Co.
*Gruendler Crusher & Pulverizer Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
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*Tyler Co., W. S.
*Williams Patent Crusher & Pulverizer Co.

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*Tyler Co., W. S.

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**Separators (Magnetic)**
Patterson Fdry. & Machine Co.

**Sheaves**
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*Eagle Iron Works
*Gruendler Crusher & Pulverizer Co.
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*Link-Belt Co.
*Jeffrey Mfg. Co.
McLanahan and Stone Corp.

**Shovels (Electric, Internal-Combustion and Steam)**
*Bay City Shovels, Inc.
*Harnischfeger Corp.
Industrial Brownhoist Corp.
*Koehring Co.
*Lima Locomotive Wks., Inc.
*Link-Belt Co.
*Manitowoc Engr. Works
Michigan Power Shovel Co.
Northwest Engr. Co.
Thew Shovel Co.

**Silos**
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Marietta Concrete Corp.

**Skip Hoists and Skips**
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*Bartlett & Snow Co., C. O.
Chain Belt Co.
Hetherington & Berner, Inc.
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*Link-Belt Co.
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*Cincinnati Rubber Mfg. Co.

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Knickerbocker Co.

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*General Electric Co.
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**Sprays**
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**Sprockets and Chain**
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*Bartlett & Snow Co., C. O.
Chain Belt Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.

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*Jeffrey Mfg. Co.

**Starters (Automatic, Motor)**
*General Electric Co.

**Steel (Alloy)**
(See Alloys—Steel)

**Steel Grating** (See Grating, Steel)

**Steel Plate Construction**
Hetherington & Berner, Inc.
Manganese Steel Forge Co.
Taylor-Wharton Iron & Steel Co.

**Stone Grapples**
Owen Bucket Co.

**Storage Equipment**
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Chain Belt Co.
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
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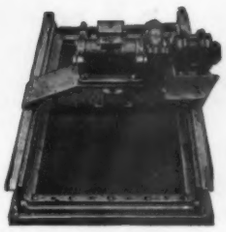
* See also information in the 1936 Pit and Quarry HANDBOOK.

# Fine Screening by THE Leahy

## 10 YEARS OF SATISFACTORY SERVICE At Clear Lake Sand & Gravel Co.



NO-BLIND SCREEN

Specially designed for fine screening.

Built extra sturdy.

"About ten years ago we purchased from you a Leahy No-Blind Vibrating Screen. We have spent approximately $50.00 for repairs on this screen with the exception of the screen jackets that have been replaced.

"We have produced approximately 300,000 tons of material over this screen, and we are very well satisfied with this screen, we are

Yours very truly,

C. D. Castin
CLEAR LAKE SAND & GRAVEL CO."

We also manufacture Sand Classifiers and the Deister Overstrom Diagonal Deck Washing Table for sand and gravel, which produces a premium product at minimum cost—handling from 18 to 40 tons per hour.

**Write for Bulletins**

**THE ORIGINAL**
**DEISTER CONCENTRATOR COMPANY**
Incorporated 1906
**911 Glasgow Ave. Ft. Wayne, Ind.**

# FINE GRINDING

**Costs Less with Williams Roller Mills**

More Efficient Separator
Instantly changeable from 70%—100 mesh to 99.9%—325 mesh

**Ball Bearing Operation**
**Smooth running—Trouble free**

**Stronger Construction**
**Steel Castings—Boiler Plate**
**Separator Top**

**Dries and Grinds Simultaneously**
**A more desirable Finished Product always**

Whatever the fine grinding job—LIMESTONE, CLAY, LIME, COAL, TALC, GYPSUM, or any non-metallic mineral—there's a Williams Improved Roller Mill with Super Separator to fit your particular requirements
**(Built in Six Popular Sizes)**

Repeat orders from many of America's Largest Firms testify to Williams Mills' Superiority—Write us for Descriptive information.

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Chicago, 37 West Van Buren St. — New York, 15 Park Row — San Francisco, 326 Rialto Bldg.

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OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD

WILLIAMS

PATENT CRUSHERS GRINDERS SHREDDERS

**Hammer Crushers**
**Air Separators**
**Vibrating Screens**
**Impact Mills**

# BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

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*Link-Belt Co.
Marietta Concrete Corp.
*Sauerman Bros., Inc.

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*Allen-Sherman-Hoff Co.

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*General Electric Co.

**Switches (Safety)**
*General Electric Co.

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*Bartlett & Snow Co., C. O.
*Hendrick Mfg. Co.
*Link-Belt Co.
Patterson Fdry. & Machine Co.

**Tanks (Sand-Settling)**
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
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*Pioneer Gravel Equip. Mfg. Co.
Smith Engr. Works

**Testing Sieves and Shakers**
*Hendrick Mfg. Co.
*Tyler Co., N. S.

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Aeroil Burner Co.

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*Hardinge Co.
Patterson Fdry. & Machine Co.

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Goodyear Tire & Rubber Co.

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Aeroil Burner Co.

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Nordberg Mfg. Co.

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*Allis-Chalmers Mfg. Co.
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*Allis-Chalmers Mfg. Co.
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*Link-Belt Co.

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*Link-Belt Co.
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*Allis-Chalmers Mfg. Co.
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*Fuller Co.
*Jeffrey Mfg. Co.
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*General Electric Co.

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*Cincinnati Rubber Mfg. Co.
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**Variable Speed Reducers or Transmissions**
Chain Belt Co.
*Link-Belt Co.

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*Bartlett & Snow Co., C. O.
Chicago Perforating Co.
Cross Engr. Co.
*Hendrick Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
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**Vibrating Screens** (See Screens —Vibrating)

**Vibrators**
*Jeffrey Mfg. Co.
*Tyler Co., W. S.

**Wagons (Dump)**
*Koehring Co.

**Washers (Sand, Gravel and Stone)**
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
*Eagle Iron Works
Haiss Mfg. Co., Geo.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Knickerbocker Co.
Lewistown Foundry & Mach. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Patterson Fdry. & Machine Co.
*Pioneer Gravel Equip. Mfg. Co.
Smith Engr. Works
*Traylor Engr. & Mfg. Co.
*Tyler Co., W. S.

**Welding and Cutting Equipment**
*General Electric Co.
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American Manganese Steel Co.
*General Electric Co.
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Manganese Steel Forge Co.
*Roeblings Sons Co., John A.
Stulz Sickles Co.
Taylor-Wharton Iron & Steel Co.

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*Eagle Iron Works

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**Winches and Capstans**
*Bartlett & Snow Co., C. O.
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*Link-Belt Co.
*Robins Conveying Belt Co.

**Wire and Cable (Electric)**
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*Roebling's Sons Co., John A.

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Audubon Wire Cloth Corp.
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Buffalo Wire Works Co.
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Buffalo Wire Works Co.
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**Wire Rope Slings**
American Cable Co.
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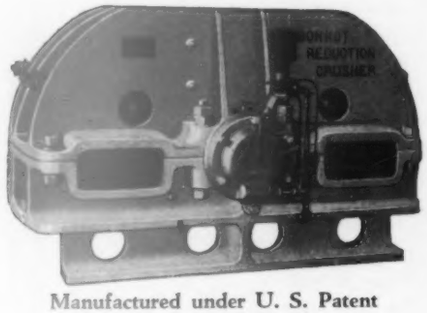
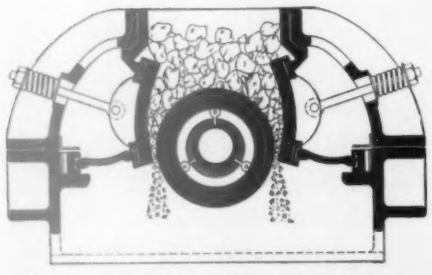
**Wire (Welding)**
American Manganese Steel Co.
Manganese Steel Forge Co.
*Roebling's Sons Co., John A.

**Worm Gears** (See Gears and Pinions)


# BONNOT REDUCTION CRUSHERS



Manufactured under U. S. Patent No. 1,946,763



Showing Slow Creep Mantle for Uniform Distribution of Wear

Actual performance in the field, whether in the far West, Eastern or Central States, on hard material, wet or dry, producing 100% through ¾", offers proof of the ruggedness and capabilities of the Bonnot Reduction Crusher. Check these features:

1. **Will produce 100%—¾" minus material;**
2. **Will handle either wet or dry material;**
3. **Will operate under full choke load;**
4. **Can be started fully loaded;**
5. **Lowest power, operating and maintenance costs.**

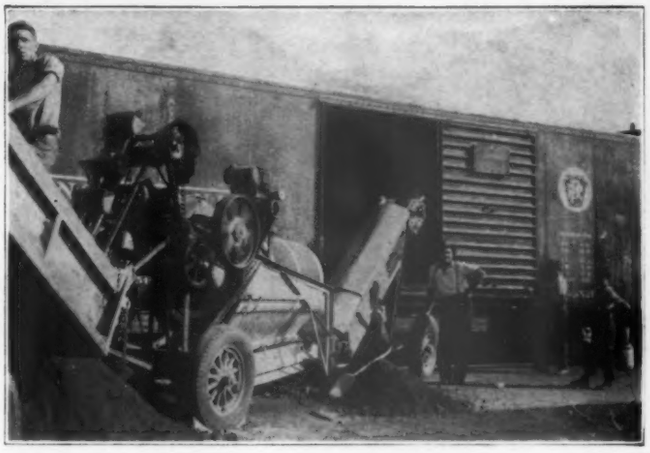
Write for bulletin No. 160.

## BONNOT CO.

CANTON, OHIO

NEW YORK—30 Church Street

*Offices in Principal Cities*



*Grinding, screening and loading molding sand*

**The Toro Grinder and Screener is substantially built throughout and can be operated by any type motor of 4 H.P. or over, or by means of a tractor equipped with belt pulley. The 36-inch screen can be furnished in any size from ⅛" to ½".**

SPECIFICATIONS

Cylinder, 4 heavy steel bars, 3-inch diameter; solid heads, 30 inches long; square steel teeth, ⅞-inch; heavy concave with 2 rows teeth, ⅞-inch. Screen 36-inch diameter, 60-inch length. Overall height, 6 feet,—with elevator 7 feet; width 4 ft., length 9 ft., weight 1000 lbs. Mounted on two wheels for transporting.

If interested in reducing screening costs, write today.

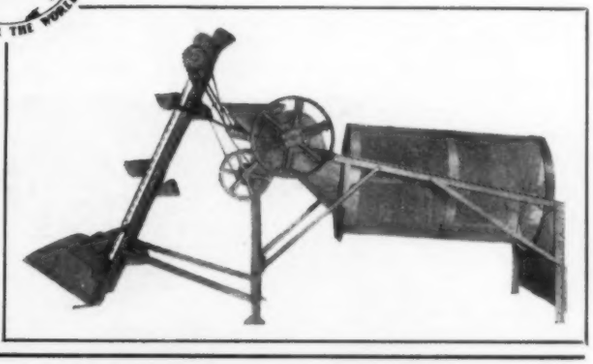
**TORO MANUFACTURING CORPORATION, Minneapolis, Minn.**

## "The Toro does the best work of any machine in our territory and at the least cost."

**W. J. Dyer, Jonesville, N. Y.**

**For over twelve years the Toro Grinder and Screener has been accepted as standard on hundreds of golf courses and municipal park systems. Widely used in new construction for grinding and screening sand, gravel and soil, many of the first machines are still giving splendid service. Surprisingly low cost.**

TORO — ALL OVER THE WORLD



# STEDMAN 2-STAGE SWING HAMMER PULVERIZERS

**For Limestone, Lime & Similar Materials**

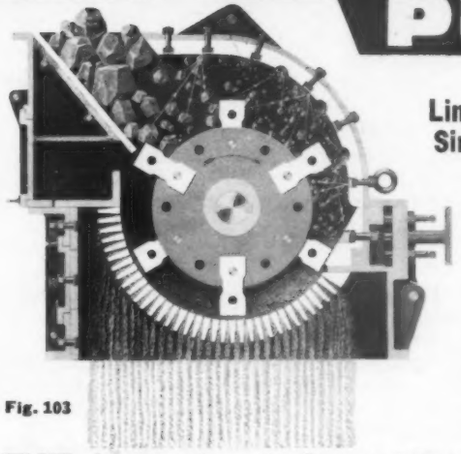


Fig. 103

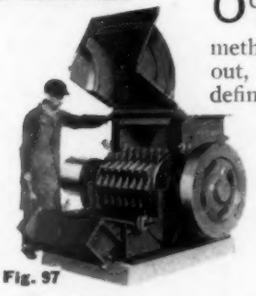


Fig. 97

OUTSTANDING features offered in these Pulverizers are the Stedman 2-Stage reduction method; heavy manganese wearing plates throughout, protecting the housing of the Pulverizer indefinitely from wear; adjustable grinding plate of manganese steel; SKF bearings; built-in metal trap for taking care of tramp iron; extreme sectional construction for quick, easy adjustments and inspection; heavy substantial construction throughout, assuring long life and low maintenance cost.

THE above cut shows the Stedman 2-Stage principle for reducing materials . . . an exclusive Stedman feature. As the product enters the grinding chamber of the Pulverizer, it is shattered in suspension by the fast revolving manganese steel hammers which drive it away from the rotor against the heavy manganese steel breaker plates in the cover. After striking the heavy breaker plates, the material rebounds, coming in contact with the hammers many times before passing to the adjustable grinding plate where the final grinding is accomplished. The material then passes on to the screen bars for final sizing, a small percentage of the over-size material being retained for further contact with the hammers.

*Closeup view at left of a large Stedman 2-Stage Swing Hammer Pulverizer. Note the hinged cover which has been raised and the hinged grinding plate holder folded outward, providing extreme accessibility to all parts of the Pulverizer.*

Stedman Pulverizers can be furnished with standard pulley for flat belt drive; V-belt for short center drive, or flexible coupling for flexible motor drive.

They are also built with ring and yoke type rotors for lime, coal and similar materials. Stedman Pulverizers are made in Seven (7) sizes for various tonnage.

**STEDMAN'S FOUNDRY & MACHINE WORKS** 307 INDIANA AVE., AURORA, INDIANA, U.S.A.
FOUNDED 1834

# NEW! DEMPSTER Bucket DUMP!

The picture tells the story. The DEMPSTER DUMP is furnished complete and mounted on any truck chassis—or you *can mount themonthetrucksyounowown.*

It's easy to load. The detachable buckets can be spotted at convenient points throughout the quarry. The truck picks 'em up!

GET BIG FOLDER

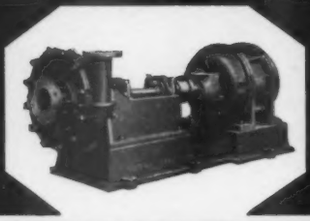
## DEMPSTER BROS. INC.

KNOXVILLE TENN.

*L. W. Morgan, Supt. Williams Lime Mfg. Co., says: "The most practical piece of equipment we have ever used. So simple any truck driver can immediately handle it . . . A real time and money saver."*

# MORRIS

## CENTRIFUGAL PUMPS



For handling abrasive materials, corrosive liquids, or clear water. Special designs and materials for each service to provide long life, maintenance of initial high efficiency and low upkeep cost.

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MORRIS MACHINE WORKS
Baldwinsville, N. Y.

MORRIS MACHINE WORKS · BALDWINSVILLE, N.Y.

## MECHANICAL RUBBER PRODUCTS for All Industrial Needs

**TRANSMISSION BELTING**
**CONVEYOR BELTING . . .**
**HOSE . . . PACKING . . .**
**MOLDED PRODUCTS**

## THE REPUBLIC RUBBER CO.

YOUNGSTOWN, OHIO

## DIGS AND HAULS Large Yardage AT LOW COST

There in a few words is told the reason for the great popularity of the

**SAUERMAN SLACKLINE SCRAPER**

You buy it for less and you pay less per day to operate it.

**Scraper bucket sizes range from ⅓ cu. yd. to 15 cu. yds. Operating spans: 100 to 1500 ft. Write for Catalog.**

**SAUERMAN BROS.** 434 S. Clinton St. CHICAGO

## Only the SELECTRO by JIGGER GIVES YOU A VIBRATING SCREEN WITH—

1. Selective Vibration, Throw
2. Full Tilting
3. Full Circle Throw
4. Oil—Not Grease—Lubrication
5. Ruggedness, Low Operating Costs

Send for new data book on screening

*Write for More Information*

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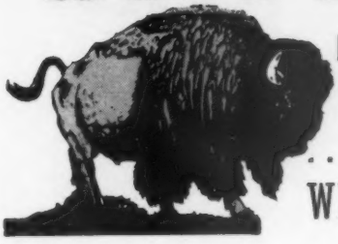

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...THIS MODERN WIRE SCREENING

*Standard Size Meshes in Stock*

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*Special Weaves Made to Order*

Long experience with wire cloth and constant laboratory development have made BUFF-ALOY the most superior wire cloth on the market. The modern, increased production demands cause severe abrasion on ordinary wire cloth. It means short wire life and high cost replacement. BUFF-ALOY was created for just such continuously operated screening equipment.

*Send for Bulletin* 101-B

**BUFFALO WIRE WORKS COMPANY**

*(Formerly Scheeler's Sons—Est. 1869)*

526 Terrace, Buffalo, N.Y. Philadelphia Branch: 11 So. 7th St.

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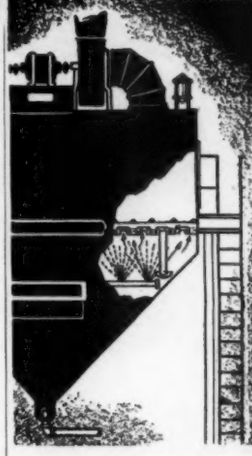

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*no moving parts*
*no wear*
*no repairs*

● **Trouble-free operation and high recovery are assured. No manual supervision. No replacement of filtering units. No fire hazard. Descriptive literature sent on request. The C. O. Bartlett & Snow Company, 6197 Harvard Ave., Cleveland, Ohio. Representatives in the principal cities.**

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CONVEYORS • ELEVATORS • SKIP HOISTS • FEEDERS
CHAINS • SPROCKETS • DRYERS • COOLERS • SCREENS

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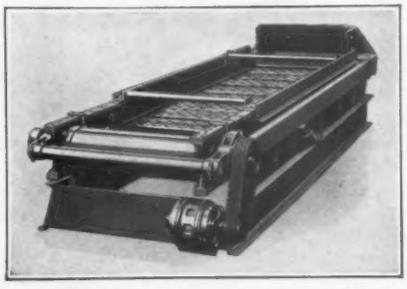

Sets level
Saves headroom
Greater capacity
Closer sizing
Automatic feed
Dust-tight bearings

Used on the World's largest projects including COULEE DAM, COLORADO RIVER AQUEDUCT, BOULDER DAM, T.V.A. and many others. Write for performance records.

**Symons Bros. Development Co.**
1462 N. Stanley Ave., Hollywood, California
and
Nordberg Manufacturing Company
Milwaukee, Wisconsin

At Hawley plant of Colorado River Aqueduct, Symons Screens are separating 200 tons per hour into four graded sizes

Roll Crusher with Pulsating Feeder

*High Capacity*

## CRUSHERS and SCREENS

Built for maximum output at minimum cost, New Holland Roll Crushers are equipped with New Holland Pulsating Feeders, actually doubling capacity. Rib shell construction increases angle of grip and reduces dust. Every detail designed to give added speed in screening. Rubber cushioned cloth and bumpers, stretched cloth and efficient operating principle, all contribute to the extra high capacity of New Holland Vibrating Screens. All sizes, 1, 2, or 3 decks.

**New Holland Machine Co.**

P.O. Box No. 200 New Holland, Penna.

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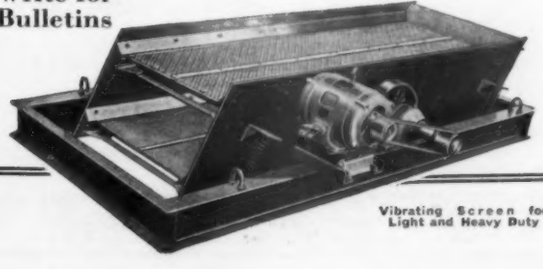


Vibrating Screen for Light and Heavy Duty

FREE
RADIO

AIR
CONDITIONED

SPRING
WATER

Visit the
Medford
OASIS
and the
Martin
MIR-O-BAR

# TWO HOTELS with a SINGLE SLOGAN

"Where the Guest Becomes an Individual, not a Number"

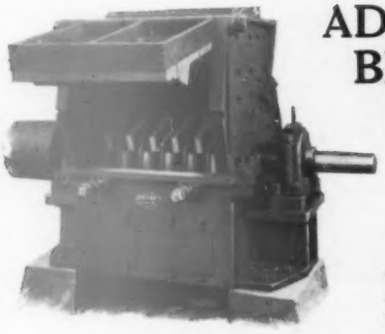
Individualism is an important factor when traveling. We adhere to the belief that a guest should be treated as a person and his wants looked after. We believe our reputation is proof of that adherence.

Two Modern
COFFEE SHOPS

Old English
DINING ROOM

MEDFORD and MARTIN HOTELS
RIGHT DOWNTOWN — OVERLOOKING THE LAKE

RATES FROM
1.50 UP



## ADJUSTABLE BREAKER PLATE

Can be adjusted while swing hammer pulverizer is running.

Lifts out of way for changing hammers or screen bars.

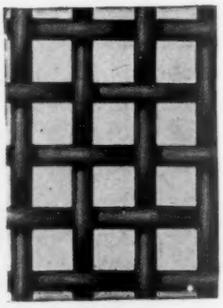
Heavy renewable liners.

Catalog No. 550-G

**The Jeffrey Manufacturing Co.**
917-99 N. Fourth St., Columbus, Ohio

## FIVE STAR FEATURES
of Nat-aloy Wire Cloth

- ★ Withstands vibration without crystallization
- ★ Super-tough to resist abrasion
- ★ Maintains accuracy throughout life of screen
- ★ Has outworn other special alloy cloths
- ★ Economical in price and serviceability



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Foot of Belle Street, St. Paul, Minn.

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## EQUIPMENT FOR QUARRIES

**STATIONARY COMPRESSORS**
for permanent installation in operation of quarries and mills
**PORTABLE COMPRESSORS**
for preliminary work in opening up new quarries
**DIESEL AND GAS ENGINES**
for driving the crushing plant
**WAGON DRILLS AND TRIPOD (DRIFTER) DRILLS**
for snake holing and deep ledge work
**ROCK HAMMERS**
for boulder popping and shallow bench work
**PUMPS**
for all services
**V-BELT DRIVES**

**WORTHINGTON PUMP AND MACHINERY CORPORATION**
General Offices: HARRISON, NEW JERSEY
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The old reliable result-producers known the world over for their truly remarkable performance under the most exacting service conditions.

Gruendler crushers and pulverizers prepare rock for cement mills or aggregate at extremely low cost per ton. Capacities from 10 tons to 4000 tons daily. All steel construction—low upkeep cost.

Also Hammer Mills, Ring Mills, Roll Crushers, Jaw Crushers, Screen and Conveying equipment of most rugged design for long life. Rock and gravel crushing screens and washers.

Equipment for Both Fixed and Roadside Plants.

**GRUENDLER CRUSHER & PULVERIZER CO.**
Since 1885
2915 N. MARKET ST. Dept. P.Q. ST. LOUIS, MO.

# world's record bridge or simple trench IS THE SAME TO Owen Buckets

Whether digging caisson footings for the San Francisco-Oakland Bridge—the Golden Gate Bridge or excavating a simple sewer trench, owners of Owen Buckets profit by unusually low costs for extra long periods of service.

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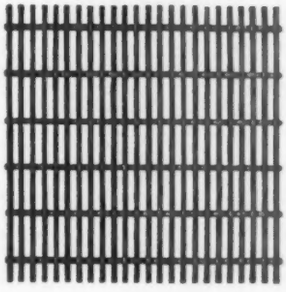

Rolled Slot

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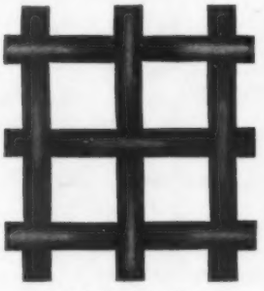
A super wearing Steel developed to resist the abrasion and vibration of modern screening demands.

"CLEVELAND" SCREENS

A wire cloth of guaranteed accuracy backed by fine workmanship and an effort to satisfy.

Available in Square Mesh and Rolled Slot. A trial will convince you of the superiority.



2 Mesh .162 Ga.

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Your copy of this dust control book No. 22

This new book illustrating and describing the American Dustube Collectors and their applications, also contains pertinent data for the figuring of dust control problems. Send for your copy of the book while the supply lasts.

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**The AMERICAN FOUNDRY EQUIPMENT COMPANY**
*430 Byrkit St., Mishawaka, Indiana*

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11-13½% Nickel Manganese Steel
(U S. Patents 1,876,738, 1,947,167 and 2,021,945)

# WELDING ELECTRODES

## FOR WELDING AND BUILDING UP

all worn down and broken 11 to 14% manganese steel castings and rolled parts.

## FOR ARMORING BY WELDING

any steel surface subjected to severe impact and abrasion.

## MANGANAL UNCOATED ELECTRODES

*Supply These Superior Features*

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IV.—Can be peened immediately after deposition while hot.
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IX.—No checking of weld deposit.
X.—All elements are contained in the metal which gives the correct analysis in the weld.

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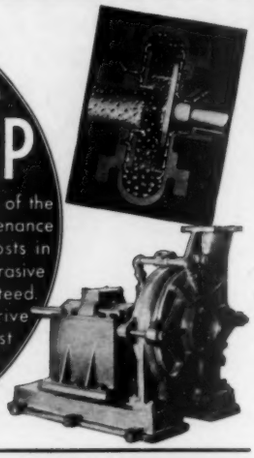
Unique principle of hydrosealing both sides of the impeller against abrasive wear, cuts maintenance to a fraction and saves ⅓ in power costs in pumping sand, gravel, rock and other abrasive materials—Estimated economies guaranteed. Sizes 2" to 22", pulley or motor drive. Descriptive Catalog sent on request.



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# KNICKERBOCKER Soft Stone Eliminator

Processes gravel or crushed stone to meet any reasonable soundness or abrasion specification by rapid, economical, thorough elimination of soft, friable, or absorbent pieces. Remarkably low operating cost and will pay for itself quickly. Write for details.

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*Chapman Gravel Co., Shiawasse Co., Mich.—user of K.S.S.E. for 5 yrs.*

*Try* **HENDRICK Vibrating Screen Plate** *for higher efficiency greater capacity and longer life.*

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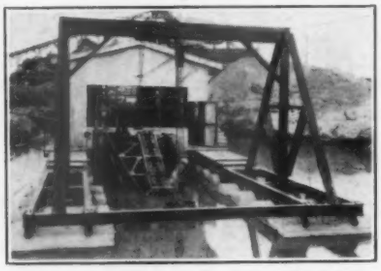
*Sales Offices in Principal Cities. Please Consult Telephone Directory*

# EAGLE SWINTEK SCREEN NOZZLE LADDER LOWER YOUR COST



Will eliminate stoppages and slug pumping—insuring an even, constant feed of solids to the suction nozzle—with less power—greatly decreasing the cost per yard of material produced.

Write for descriptive literature and let us tell you how this can be done with your dredge.

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- ☐ Bags, cloth
- ☐ Bags, paper
- ☐ Balls, steel
- ☐ Barges, steel
- ☐ Belt Dressing
- ☐ Belt fasteners
- ☐ Belting, conveyor and elevator
- ☐ Belting, transmission
- ☐ Belt lacing
- ☐ Belt plates
- ☐ Belt rivets
- ☐ Belt tighteners
- ☐ Bin gates
- ☐ Bins, concrete
- ☐ Bins, steel
- ☐ Blasting supplies
- ☐ Blasting powder
- ☐ Blocks, friction
- ☐ Boats, self-unloading
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- ☐ Buckets, Conveyor and Elevator
- ☐ Buckets, Dragline
- ☐ Buckets, Orange Peel
- ☐ Cableways, Slackline
- ☐ Calcining Machinery
- ☐ Car Dumpers
- ☐ Car Pullers and Movers
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- ☐ Cars, Dump
- ☐ Cars, Kiln
- ☐ Castings, Manganese Steel
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- ☐ Chains, Conveyor and Elevator
- ☐ Chains, Power Shovel, Crane and Dredge
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- ☐ Crushers, Jaw
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High velocity of hot or cold dust-laden gases in restricted tubes saves power and produces centrifugal effects several hundred times stronger than gravity. Exceptionally high efficiency economizes space and installation costs. Built in units of various multiples of tubes, Multiclones offer perfect flexibility as to capacity, and will collect finer particles than any other type of centrifugal separator. Simple, compact, fireproof, for inside or outside installation. New Bulletin now available.

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*FOR UNIFORM VIBRATION*
*• . . . NO "DEAD" AREAS*
*USE*

# LINK-BELT *VIBRATING* SCREEN

● The Link-Belt Vibrating Screen has proved its effectiveness in the screening of all sorts of materials, such as sand, gravel, crushed stone, coal, coke, clay, fertilizer, lime, ore, grain, sugar, chemicals, pulpwood chips, etc. Its uniform vibration keeps the meshes open, and makes the screen's entire screening surface 100% effective.

Send for Catalog No. 1562. Address Link-Belt Company, Philadelphia, Chicago, Indianapolis, Atlanta, San Francisco, or any of our offices located in principal cities.

5886

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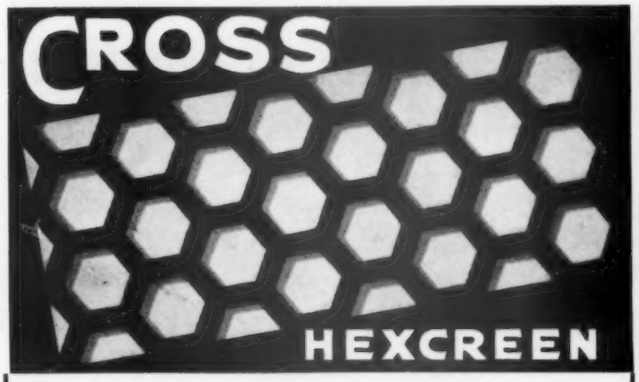

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The best possible combination of accurate sizing, long wear, large capacity and economy. Tests under every day conditions are consistently proving these advantages. Why not have this four point superiority in your equipment without delay?

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**The Marietta Concrete Corp.**
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For low belt cost per ton conveyed buy

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THE CINCINNATI RUBBER MFG. CO.
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## Performance-Tested

BUCKET ELEVATORS
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CRUSHERS DRY PANS

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TRUE MANGANESE STEEL

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Highest abrasion resistance of any known steel. Double Lock Mesh Weave perpetuates initial accuracy for the life of the screen. Send for prices and performance facts.

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*Complete specifications included*

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BENTON HARBOR . . . . . MICHIGAN

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*Heavy-Duty (Ball-Bearing) Sand and Gravel*

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High efficiency — low operating cost—precision workmanship — wear-resisting, non-heating bearings even when operated under extremely high heads. WRITE

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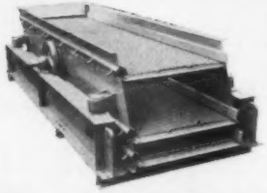
CIRCLE-THROW MECHANICALLY AND ELECTRICALLY-VIBRATED

TON-CAP



and Woven Wire Screen
In all Meshes and Metals

Scrubbers and Dryers

THE W. S. TYLER COMPANY
3623 Superior Avenue Cleveland, Ohio

# "E. C. A. Rebuilt" Quarry & Gravel Plant Equipment

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Portable and stationary, belt, with elec. or gas power, sizes from 21 cu.ft. to 1,000 cu.ft.

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1—4-yd. Hayward Class "G" clamshell.
34—Williams, Blaw Knox, Owen clamshell buckets, all sizes and types.
5—Dragline buckets, 1—Northwest 1¾-yd., 2—Page 1½-yd., 1—Page RC 1¼-yd., 1—Blaw Knox 1-yd.

### CABLEWAY EXCAVATOR AND DRAGSCRAPER OUTFITS

6—Dragscraper buckets from ½ cu. yd. to 2 cu. yd. size.
1—Thos. 150 HP DD special cableway excavator hoist No. 7671, Class L, for handling 2 yd. bucket.
1—O. K. Clutch & Machinery Co. 120 HP, 3 drum gasoline dragscraper hoist for handling 2 yd. bucket.
1—National 50 HP, 2-speed, electric dragscraper hoist for handling 1 yd. bucket.

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Large lot including std. ga. 6 and 12-yd. and 20-yd., 36-ga. 5 yd. and 24-ga. 1½-yd.
16—2 yd. 36 inch ga. Continental 2-way wood body dump cars.
4—30-yd. Clark Standard gauge air dump cars, drop door type.

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9—Port. belt conveyors with steel frame, gas, or elec. pr. 18 and 24 in. Barber-Greene and Chic. Automatic.
11—Bucket elevators: 6— Chain Belt Co., Weller, and Link-Belt vertical enclosed type; capacities from 35 to 117 tons per hour. 5—Weller inclined type. Nos. 3, 4, 5 and 6 up to 170 yds. per hr.

### CRANES (Locomotive)

5—Locomotive cranes; sta. ga. 30 and 25-tons; Ohio, Browning, American, Industrial.

### CRANES AND DRAGLINES

2—Koehring Model 501 draglines, Serial Nos. 960 & 1070, 45′ boom, 1¼-yd. bucket.
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2—Northwest Model 105, Serial No. 756 and 2053, 40′ boom, 1-yd. bucket.
1—Link Belt Model K-1 crane, shop No. 1024, 50′ boom, 1-yd. bucket.
1—Osgood heavy duty dragline, Serial No. 2069.
1—Industrial Brownhoist type CC, No. 5071 30′ boom, ½-yd. bucket.
1—Byers Bearcat crane, Model 26, Ser. 30474, half circle swing, ½-yd. bucket.
1—Erie type B-2, Serial No. 3900 steam crane, 40′ boom, 1-yd. bucket.

### CRUSHERS

1—Symons coarse cone crusher, size No. 5½, SU No. 521.
1—Set P & M crushing rolls, size 42″ x16″.
1—Allis-Chalmers, Style N, No. 6, gyratory No. 7755.
1—Allis-Chalmers Gates No. 5, Ser. 5331.
2—McCulley No. 3 gyratory crushers.
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Steel and wood, stiff leg, or guy; from 2 to 50 tons, including 2 steel stiff legs.

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32—Gasoline locomotives, from 20-ton to 2-ton, std. ga. 36″ and 24″ ga. including 1—12-ton Plymouth std. ga. gasoline locomotive Model JLB, Ser. No. 2308.
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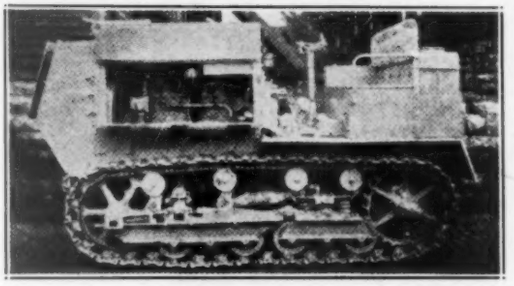

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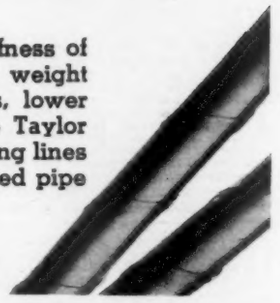

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This shovel has worn out a dozen loading lines. Six were non-preformed ropes; six were TRU-LAY Preformed.

In comparison with the other ropes (under identical working conditions), TRU-LAY Preformed moved more dirt, for a much longer time.

TRU-LAY Preformed invariably lasts longer. It lasts longer because it is a relaxed, preformed rope. It resists kinking, spools on the drum better, resists the fatigue of reverse bending, handles easier. In short, TRU-LAY Preformed gives longer service—gives greater dollar value. Specify TRU-LAY for *your* job.

**AMERICAN CABLE COMPANY, Inc.**

Wilkes-Barre, Pennsylvania

An Associate Company of the American Chain Company, Inc.

*IN BUSINESS FOR YOUR SAFETY*

*District Offices:* Atlanta Chicago Detroit Denver New York Philadelphia Pittsburgh Houston San Francisco

## TRU·LAY *Preformed* Wire Rope

ALL AMERICAN CABLE COMPANY ROPES MADE OF IMPROVED PLOW STEEL ARE IDENTIFIED BY THE EMERALD STRAND

ESTABLISHED 1835
WHEN RAILROADS
FIRST CROSSED THE
ALLEGHENY
MOUNTAINS

WE ARE ENTERING OUR
SECOND CENTURY IN
THE MANUFACTURE
OF REDUCTION
MACHINERY

# McLANAHAN

One of two 30-ton per hour dragline buckets

Washing silica sand in Maryland

Primary Roll crushing machine in Hawaii for the sugar industry

Complete Cinder Crushing Plant with Rolls, screens and Elevators

Double Roll Reduction Crusher in Florida hard-rock plant

Reciprocating Feeder ahead of Crusher

Secondary Double Roll in a Kansas Limestone Plant

These typical McLanahan installations are just a few of the many made in 1936—the 101st year of our service to industry. You are assured of profitable performance when you install McLanahan equipment. Its high efficiency is due to advanced mechanical features, developed during a century of experience. Write for information

36" x 60" Single Roll Primary Crusher handling shovel-loaded stone

Two Single Rolls on limestone and on coal in this modern plant

McLANAHAN & STONE CORPORATION
HOLLIDAYSBURG PENNSYLVANIA




JUN 3 1940